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THESIS

THE NAVAL OFFICER OF 2020

by

Daniel L. Packer, Jr.

September 1998

Thesis Co-Advisors:

George Thomas
Julie Filizetti

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THE NAVAL OFFICER OF 2020

Daniel L. Packer Jr.
Lieutenant, United States Navy
B.S., United States Naval Academy, 1992

Submitted in partial fulfillment
of the requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL

September 1998

Author:

[REDACTED]
Daniel L Packer, Jr.

Approved by:

[REDACTED]
George Thomas, Thesis Co-Advisor

[REDACTED]
Julie Filizetti, Thesis Co-Advisor

[REDACTED]
Reuben T. Harris, Chairman
Department of Systems Management

ABSTRACT

The naval officer of 2020 must be different than the naval officer of today. The environment has changed and the military and the naval service must change with it. For the naval service to be effective and relevant in the dynamic and uncertain environment of the future, the Navy must be fast, responsive to change as measured in seconds and minutes rather than the hours and days of the past. This necessitates that the combat forces, at least, within the Navy be organized in a very flat hierarchy. There will be little or no time for information to flow up and down the chain of command. Decisions are going to have to be made at the lowest level possible. Consequently, the Navy will require officers capable of making decisions and officers capable of leading decision makers. The intent of this thesis is to frame a dialogue about the future naval officer by creating a vision of the naval officer of 2020 and presenting recommendations for the development and management of these officers.

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EXECUTIVE SUMMARY

A. OVERVIEW

The naval officer of 2020 must be different than the naval officer of today or the naval officer of the past. The environment has changed and the military and the naval service must change with it. For the naval service to be effective and relevant in the dynamic and uncertain environment of the future, the Navy must be fast, responsive to change as measured in seconds and minutes rather than the hours and days of the past. Since munitions can only travel so fast, every second needs to be cut from the decision cycle. This demands that the combat forces, at least, within the Navy be organized in a very flat hierarchy. There will be **LITTLE** or **NO** time for information to flow up and down the chain of command. Decisions are going to have to be made at the lowest level possible. Consequently, the Navy will require officers capable of making decisions and officers capable of leading decision-makers. As Figure 1-1 graphically displays, for the Navy to be effective and relevant in the dynamic and uncertain environment of the future, it will need speed of command. This speed of command in turn requires the use of information technologies as a component part of the current Revolution in Military Affairs (RMA), a flat hierarchical network centric organization, and the naval officer of 2020. In addition, the Navy needs human resource management processes that are aligned with the strategy, tasks, technology, and structure of the Navy of the future. The intent of this thesis is to initiate a dialogue about the future naval officer by creating a vision of the naval officer of 2020 and presenting recommendations for the development and management of these officers.

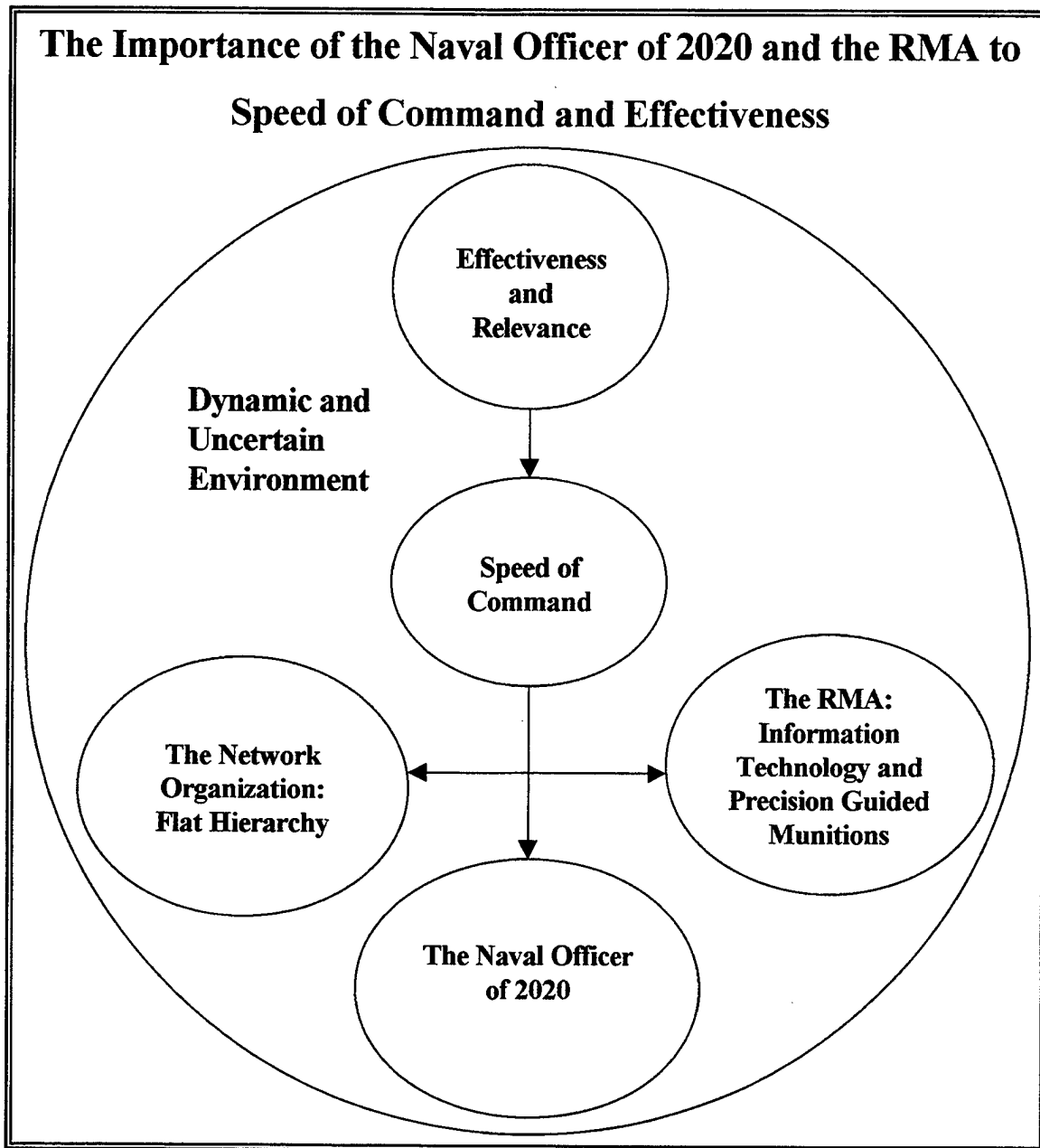


Figure S-1. The Importance of the Naval Officer of 2020 and the RMA to Speed of Command and Effectiveness

B. SCOPE/METHODOLOGY

This thesis seeks to answer the questions of how to adapt our leadership, education and training, and other human resource management practices to meet the high tempo, high technology demands posed by the new concepts in *Joint Vision 2010* and other visions of future armed conflict. The answers to these questions were obtained by synthesizing:

- (1) selected readings on modern leadership and management,
- (2) recent literature on the future operating environment, the future of conflict, and the revolution in military affairs,
- (3) the Skills, Knowledge, and Attributes for the field grade Army officer of the 21st Century as identified by the Science Applications International Corporation for the Army's OPMS XXI Task Force, and
- (4) the interview results of 15 active duty military officers ranging in rank from O-6 to O-10, 2 retired military officers (1 retired O-6 and 1 retired O-8), 2 senior level civilian Department of Navy officials, and 4 Professors from the Naval Postgraduate School.

C. INTERVIEW RESULTS

The interviews were conducted at the Pentagon, at National Center 1 in Arlington, VA, and at the Naval Postgraduate School. The sample consisted of 15 active duty military officers ranging in rank from O-6 to O-10, 2 retired military officers (1 retired O-6 and 1 retired O-8), 2 senior level civilian Department of Navy officials, and 4 professors from the Naval Postgraduate School. There were 21 white males, 1 non-white male, and 1 white female. In addition, out of the 15 active duty military officers interviewed, 13 were naval officers, 1 was an army officer, and 1 was a marine corps officer. A standardized interview protocol was used. The personal interviews were recorded on audiocassettes. The information was then transcribed, verbatim, for complete analysis. The analysis led to the development of 8 themes that are listed in Table S-1.

Major Themes from Interviews

1. Theme I: The naval officer corps in 2020 will require more specialists and fewer but broader generalists/unrestrictedline officers (URL) than those in service today.
2. Theme II: Information Technology is and is going to be a core competency for all Naval Officers.
3. Theme III: Naval Officers, even at the most junior level, will be required to be mentally agile and able to make quick decisions in a dynamic and uncertain environments.
4. Theme IV: Future Naval officers will have to be educated and trained in the joint arena to include coalition warfare at an early stage in their careers.
5. Theme V: Information technology and the potential reduction in crew sizes will change what it means to be an effective leader.
6. Theme VI: The officer of the future must be well-versed in building, participating, and leading multi-disciplinary teams.
7. Theme VII: Outsourcing will pose some difficulties for the officer corps of 2020.
8. Theme VIII: Demographic changes within the United States will be an opportunity for the Naval Officer of 2020.

Table S-1. Interview Themes (Source: Author)

D. A VISION OF THE NAVAL OFFICER OF 2020

Using the interviews and the current literature, a vision of the naval officer of 2020 emerged. The following sections describes this vision.

1. Specialists versus Generalists

The naval officer corps of 2020 will need to be populated by more specialists than generalists/unrestrictedline officers (URL). There are three factors that will necessitate this shift. First, the future reduction in crew size and the probable shift in emphasis from manned to unmanned aviation and precision guided missiles will lead to the need for fewer generalists.¹ Second, the growing complexity of technology, especially information

¹ Unmanned aviation and precision guided missiles will never totally eliminate the need for manned aviation. There will, however, be a shift in emphasis that will reduce the need for naval aviators and consequently will reduce the need for generalist/URL officers as aviators represent the largest part of the URL.

technology, will require specialists capable of understanding and applying technology to greater depths than ever before throughout the fleet. A prime example is the current absence of, and need for, a designated information warfare community. Under the current system, this area is assigned to both the cryptologists and fleet support officers in the Space and Electronic Support core competency. There has been a move to merge these two groups by the Chief of Naval Operations, but after a year it has still not taken place.² This is an area for potential disaster as the Navy and as the rest the military grows more and more dependent on these information systems. Third and most importantly, the growing complexity of warfare will require the full immersion of the generalist warfighter into the study and use of all types of force in war and conflict short of war. As a senior military officer in one of my interviews noted, "the use of military power in the early 21st century will be so subtle as to require extraordinary situational awareness that [only] comes with full immersion." There will not be time in the warfighters career to manage or learn how to manage an organization as large as the Navy or the Department of Defense. Consequently, the jobs in support of fleet operations that generalists have filled in the past will have to be filled primarily by specialists. Generalists or more accurately specialists in warfare while on shore duty should generally perform functions that hone their combat skills and/or create combat skills in other specialists in warfare. In essence, the URL officer needs to become more generalist and concentrate more of his time and effort on becoming more a specialist in the practice of naval warfare.

2. Skills, Knowledge, Abilities and Attributes of the Naval Officer of 2020

Table S-2 and Table S-3 list the Skills, Knowledge, Abilities, and Attributes (SKAA) of the officer of 2020. The SKAA are organized into Task clusters. Skills refer to the capability to perform job operations with ease and precision. Knowledge refers to the body of information necessary to make adequate job performance possible. Ability refers to

² Speech of VADM Arthur K Cebrowski, Director Naval Warfare Development Center, Naval Postgraduate School, 3 Aug. 98.

the cognitive capabilities necessary to perform a job function.³ Finally, attributes are the baseline characteristics that ALL naval officers need to be successful. These SKAA are applicable to the URL officer/specialist in warfare of the future at the senior division officer/departmenthead level. They also apply, but to a lesser degree, to the specialists that we are going to need in the future.

I. Clusters of Skills, Knowledge, and Abilities for the Naval Officer of 2020

(A) Traditional platform centric cluster

- Ship and aircraft handling and maneuver.
- Knowledge of and the ability to apply technology on the platform level.
- Knowledge of and the ability to perform single unit operations and tactics. (More emphasis is needed here than is typically done today)

(B) Leadership cluster

- Ability to lead in the new era with more emphasis on collective learning and less concentration on charismatic leadership.
 1. Ability to deal with the shifting nature of power in the information age and the ability to deal with the loss of control of leaders in an information technology revolution.
 2. Ability to undertake what Senge's calls the leader's new work.⁴
 - Design and/or engineer processes.
 - Education and training of subordinates, superiors, and peers.
 - Stewardship of subordinates and the mission.
- Ability to delegate to the lowest possible level.
- Ability to develop and embody a vision.
- Ability to build, participate in, and lead multi-disciplinary teams.
- Ability to lead and manage personnel from diverse backgrounds.
- Knowledge of the human dimension warfare and the ability to use it one's own advantage.

Table S-2. Clusters of Skills, Knowledge, Abilities for the Naval Officer of 2020 (Source: Author)

³ Paul M. Muchinsky, *Psychology Applied to Work*, (Brooks/Cole Publishing: Pacific Grove, CA, 1997), p. 182.

⁴ Peter M. Senge, "The Leaders New Work: Building Learning Organizations," *Sloan Management Review*, (Fall 1990).

I. Clusters of Skills, Knowledge, and Abilities for the Naval Officer of 2020 (CONT)

(C) Decision making cluster

- Ability to make quick decisions in a dynamic and uncertain environment.
- Thorough understanding of naturalistic (intuitive) decision making.
- Thorough understanding of the principles of heuristic decision making and risk management.
- Ability to use a full complement of rational analytical skills

(D) Integrative cluster

- Ability to integrate naval, joint, and coalition forces to formulate, articulate, and to link mission requirements to direct actions.
- General understanding of the art and science of war to include:
 - Understanding of how the U.S. military and our potential allies organize to conduct military operations.
 - Understanding of the tactical, operational, and strategic characteristics of potential adversaries ranging from terrorists to world powers .
 - Understanding of the historical and contemporary role of the military in American society.

(E) Information technology cluster

- Ability to employ sensors to optimal advantage.
- Ability to utilize C4I systems to obtain and disseminate information.
- Ability to utilize information systems to direct weapons.
- A general understanding of information technology and science to include topics on computers, satellites, etc.

(F) Management Cluster

- A general understanding of and the ability to apply modern management principles and techniques.
- A general understanding of financial management, contract management, and general business practices.
- A general understanding of logistics management.

(G) Communication cluster

- Ability to communicate a vision and current reality.
- A thorough understanding of the use of communications media: individual contact, meetings, video conferencing, e-mail, memos, etc.
- Ability to express oneself clearly and concisely in both writing and speaking.

Table S-2. Clusters of Skills, Knowledge, Abilities for the Naval Officer of 2020 (CONT)
(Source: Author)

II. Attributes of the Naval Officer of 2020

A. Engenders Trust through

- Honesty/ Integrity
- Responsibility
- Honor/Dedication to Duty
- Courage

B. Inspires Loyalty

- C. Creative/ Innovative
- D. Action-Oriented
- E. Views Their Self in Proportion
- F. Disciplined/ Professional
- G. Mutuality/Systems Perspective

Table S-3. Attributes of the Naval Officer of 2020 (Source: Author)

E. RECOMMENDATIONS

My analysis has led to me to the following recommendations.

1. Part 1: A Shared Vision of the Future Naval Officer

The first step in our journey to the naval officer of 2020 is for the Navy to develop a shared vision of what will make the future officer successful. This vision needs to be understood and actively supported by the entire organization from the Chief of Naval Operations to the "nub" ensign in the fleet. To formulate this shared vision, the officer corps needs to conduct an open dialogue throughout the organization. This is not a time for top down directed change. A great deal of work needs to be done in this area.

2. Part 2: The Design of Congruent Processes

Human resource management has seven functions: accession, development, promotion, evaluation, compensation, assignment, and separation/ transition. The manner in which each of these functions is conducted needs to be in congruence with the task, technology, structure, and people in the organization for the organization as a whole to be more effective. Therefore, comprehensive studies need to be conducted that determine how best to align human resource management with the organization's shared vision. My ideas for aligning human resource management with the Navy's direction are summarized in Table S-4. My overarching conclusion, however, is that every aspect of human resource management should be decentralized and directly related to performance in one way or another, either group

performance or individual performance. Every aspect of our system should emphasize effectiveness, collaboration, and efficiency.

Recommendations

1. Reshape the officer corps.

- Increase the population of specialists through post division officer or preferably post-department head lateral transfer of URL officers to the RL. Educate and train them in specialties such as: information operations, fleet support, or engineering and create viable career paths for these officers to flag rank.
- Shift the remaining URL/specialist in warfare officers to shore duties that involve the honing of their warfighting skills or the creation of warfighting skills in others.
- Create a community or communities charged with information systems management, information systems defense, and offensive information war

2. Access the Naval Officer of 2020.

- The Navy needs to use all means to meet its officer diversity goals in its 12/12/5 Policy. In addition, the Navy needs to incorporate the accession of women officers into its diversity programs.

3. Develop the Naval Officer of 2020.

- Integrate the indoctrination of the officer corps by placing the Naval Academy under the cognizance of the Director of Naval Training (N7).
- Charge the officer accession sources and the initial and intermediate level skills courses like the Submarine Officer Basic and Advanced Courses and the Surface Warfare Officer School's Division Officer and Department Head Courses with developing curriculum that support the SKAAs of the new naval officer. Enlarge program scope and length as necessary.
- Conduct further study on the development of intuitive/naturalistic decision making. Design programs to create these abilities at all levels within the officer corps.
- Increase tour length at sea and shore. Consider means to reduce the impact of longer tours on quality of life by looking at ways to reduce OPTEMPO/PERSTEMPO through the use of multi-crew ships.
- Assign all generalist officers and specialist officers as applicable to two professional military education experiences. The first should be more oriented toward the technical and science aspects of war while the later experience should be oriented toward the strategic art of war. Specialist officers as a minimum should have at least one professional military education experiences in their area of specialization.

Table S-4. Recommendations (Source: Author)

Recommendations (CONT)

3. Develop the Naval Officer of 2020. (CONT)

- Develop competency to manage diversity in all officers through extensive and on-going diversity training.

4. Promote the Naval Officer of 2020.

- Advise Congress to revise or rescind DOPMA.
- Consider establishing a rank-in-position promotion system rather than a rank-in-person promotion system or if that is not feasible, enlarge promotion zones and adjust promotion rate targets as necessary to support a more stable up and stay career structure.

5. Assign the Naval Officer of 2020.

- Consider shifting to a more decentralized assignment process whereby the officer applies for his next position directly to his prospective senior through the use of information technology.⁵

6. Compensate the Naval Officer of 2020.

- Base pay at least some extent on performance rather than totally on longevity. This performance measure can be either group or individual based depending on the context of the situation.
- Reduce the emphasis on non-pecuniary benefits and shift this money to raise regular military compensation.

7. Evaluate the naval Officer of 2020.

- Ensure that the Behaviorally Anchored Rating Scale currently in use reflects our vision of the successful naval officer of 2020.
- Consider the use of a 360 degree evaluation system.

8. Separate/ Transition the Naval Officer of 2020.

- Increase career length to at least 35 years and perhaps longer to maximize the utilization of the experience that we will be building in our specialists and our generalist warfighters.
- Consider shifting retirement benefits to either a defined contribution plan like a 401K or maintain a defined benefits plan that vests somewhere between the 5 and 10 year point but does not pay out benefits until actual retirement age.

Table S-4. Recommendations (CONT) (Source: Author)

⁵ Jules Borak, Interview by author, Naval Postgraduate School, 29 April 1998.

ACKNOWLEDGMENT

In any undertaking of this size, there are always a great deal of people to thank, but at the same time I will try to keep this short. First, I would like to thank Nancy Roberts for providing the conceptual framework for this study. She gave me the tools with which to think about the Navy of the future. Second, I would like to thank the 23 senior officers and civilian officials who gave up their precious time so that I could interview them. I was inspired by them one and all. Third, I am indebted to Julie Filizetti and George Thomas for giving me the confidence necessary to get out of my "box" and for guiding me through the thesis writing process. Thank you to Brad Bruner for being a "sounding board" during our work out sessions and for his many insightful comments along the way. Finally, I am grateful beyond all measure to my wife Lisa and daughter Madison for their patience, understanding, and love for without these things, this work would have been impossible.

I. INTRODUCTION

A. OVERVIEW

The naval officer of 2020 must be different than the naval officer of today or the naval officer of the past. The environment has changed and the military and the naval service must change with it. For the naval service to be effective and relevant in the dynamic and uncertain environment of the future, the Navy must be fast, responsive to change as measured in seconds and minutes rather than the hours and days of the past. Since munitions can only travel so fast, every second needs to be cut from the decision cycle. This demands that the combat forces, at least, within the Navy be organized in a very flat hierarchy. There will be **LITTLE** or **NO** time for information to flow up and down the chain of command. Decisions are going to have to be made at the lowest level possible. Consequently, the Navy will require officers capable of making decisions and officers capable of leading decision-makers. As Figure 1-1 graphically displays, for the Navy to be effective and relevant in the dynamic and uncertain environment of the future, it will need speed of command. This speed of command in turn requires the use of information technologies as a component part of the current Revolution in Military Affairs (RMA), a flat hierarchical network centric organization, and the naval officer of 2020. In addition, the Navy needs human resource management processes that are aligned with the strategy, tasks, technology, and structure of the Navy of the future. The intent of this thesis is to frame a dialogue about the future naval officer by creating a vision of the naval officer of 2020 and presenting recommendations for the development and management of these officers.

B. BACKGROUND

In December of 1997, The National Defense Panel (NDP) released their final report *Transforming Defense - National Security in the 21st Century*. This report was completed in accordance with Section 924 of the Military Force Structure Act of 1996 and was intended to

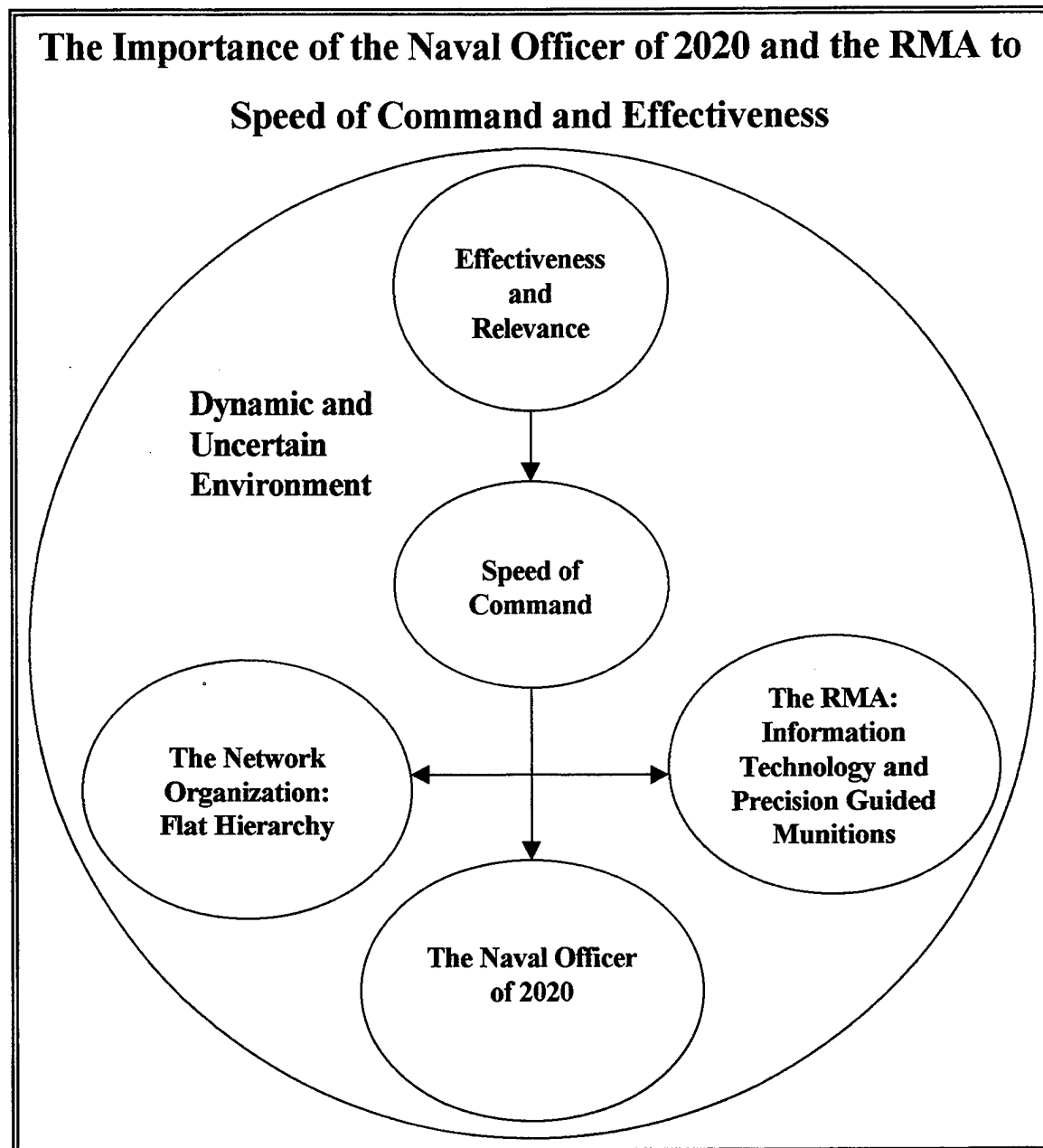


Figure 1-1. The Importance of the Naval Officer of 2020 and the RMA to Speed of Command and Effectiveness

identify the changes needed to ensure United States leadership and security of the American people in the twenty-first century. The panel was convinced that the challenges of the twenty-first century will be quantitatively and qualitatively different from those of the Cold War. Consequently, they argued that the United States must undertake a broad transformation of its military to meet the next century's challenges.⁶ The National Defense Panel is not alone in this conclusion. There seems to be agreement throughout the defense establishment that the challenges of war have changed. The environment of today is more dynamic, complex, and uncertain than ever before. Non-governmental organizations are becoming major participants in world affairs as international commerce blurs the traditional boundaries between nation-states. In addition, the proliferation of weapons of mass destruction has made the use of force immensely more dangerous and difficult. At the same time, information technology and precision guided munitions have increased the potential lethality of military forces.

Joint Vision 2010 captures the Joint Staff's vision of war in the future providing a "conceptual template for how America's Armed Forces" will prepare for war in the future. It concludes that "the United States must prepare to face a wider range of threats, emerging unpredictably, employing varying combinations of technology, and challenging us at varying levels of intensity." Preparation for this environment will center around the ability to achieve massed effects with dispersed forces instead of relying on the massed forces and sequential operations of the past. The massed effects of dispersed forces are to be synchronized and integrated through information technology. Consequently, there will be an

"increased capability at lower echelons to control more lethal forces over larger areas, thus leveraging the skills and initiative of individuals and small units. These capabilities could empower a degree of independent maneuver, planning, and coordination at lower echelons, which were normally exercised by more senior commanders in the past. Concurrently, commanders at higher echelons will use these technologies to reduce the friction of war and to apply precise centralized control when and where appropriate."⁷

⁶ National Defense Panel, *Transforming Defense: National Security for the 21st Century*, (1997), p. iv.

⁷ Joint Chiefs of Staff, *Joint Vision 2010*, (1996) pp.1, 10-11, 15, 27.

Subsequently, Joint Vision 2010 states that turning these concepts into capabilities will require "adapting our leadership, doctrine, education and training, organizations, and material to meet the high tempo, high technology demands posed by these new concepts."⁸

The conclusion of these future visions is that the demands on military officers and enlisted will change dramatically. Unfortunately, there has been little work done in identifying and preparing for these changes. The RAND Corporation completed a study on career management options for the future in *Future Career Management Systems for U.S. Military Officers* (1994) which recommended

- using greater numbers of warrant officers for use as technicians,
- having a less inclusive line by breaking officers into four categories: line, specialist, support, and professional,
- having longer careers be the rule with the requisite lengthening of promotion zones to preserve the ability to put people on the fast track,
- achieving less turnover by instituting a modified up and stay where officers who are committed to a career are allowed to stay,
- separating officers on non-command track career paths from officers that are on the command track.⁹

There were several potential alternatives analyzed in the RAND study, but it treated officer requirements only in the aggregate and did not look at the impact of technology trends in any real depth. Recently, RAND has worked on a study to determine the implications of the revolution in military affairs on the individual characteristics of enlisted personnel. The sponsor for this study was the Joint Staff (J-1), but the study has since fallen into funding problems and the completion of the study is in jeopardy.

The 8th Quadrennial Review of Military Compensation (QRMC) concluded in its report, *Rewarding, Organizing and Managing People in the 21st Century: Time for a Strategic Approach*, that (1) the scope of the human resource management function should be

⁸ *Ibid.*, 27.

expanded to encompass a more strategic role within the DoD, (2) the DoD should adopt a more flexible human resource management system that is aligned with the strategy of the organization, and (3) DoD should adopt strategic human resource management by instituting a formal and well defined decision making process.¹⁰ This work, while significant, failed to shed any light on how to adapt our leadership, doctrine, education and training, organizations, and material to meet the high tempo, high technology demands posed by these new concepts in *Joint Vision 2010*.

The Army's *Officer Personnel Management System XXI Study* (OPMS XXI) concluded that the current Army officer personnel management system required field grade officers to do too many different things for them to excel at any one of them. In addition, it saw that the requirements in the Army After Next, the Army's vision for the future, would greatly exacerbate the problems in the field grade officer ranks. Consequently, they recommended that the Army:

- Adopt a strategic approach to human resource system design and management.
- Separate officers into 4 different career fields: Operations, Operational Support, Information Operations, and Institutional Support. These career fields would be formed by grouping the existing branches and functional areas.
- Assign all Army Competitive Category officers to a career field after they are selected for promotion to the rank of major (O-4).
- Conduct promotion boards so that officers compete for promotion to lieutenant colonel (O-5) and colonel (O-6) with other officers in their career field.
- Should adopt a holistic approach by linking officer personnel management, character and leader development, and the Officer Evaluation Report into a total Officer Development System.

⁹ National Defense Research Institute, *Future Career Management Systems for U.S. Military Officers*, Harry J. Thie and Roger A. Brown, Study Directors, (RAND: Santa Monica, CA, 1994), pp. xxviii - xxxi.

¹⁰ 8th Quadrennial Review of Military Compensation, *Rewarding, Organizing, and Managing People in the 21st Century: Time for a Strategic Approach*, Executive Director Robert Emmenichs, (Defense Technical Information Center: Washington, D.C., 1997), pp. 9-10.

- Send all officers selected for promotion to major to resident intermediate-level military education and all officers selected for promotion to colonel to resident senior service college education.
- Establish new functional areas and eliminate others to address changing requirements
- Develop a mechanism to align officer authorizations and officer inventories.

In addition, OPMS XXI felt "that the fundamental developmental assignment patterns and goals for company-grade officers are about right."¹¹

OPMS XXI has gone further than any other study in discerning the future of the officer corps. It does start to answer some of the questions of how to adapt our leadership, doctrine, education and training, organizations, and material to meet the high tempo, high technology demands posed by the new concepts in *Joint Vision 2010*, but it falls short in many areas because it fails to note the effects of information technology on where and how combat decisions are going to be made in the future. The required speed of command will dictate that these decisions migrate from the field grade officers that OPMS targets to the company and platoon level officers of the future. Therefore, OPMS XXI, while significant, does not adequately address the issues that will be facing the military in 2020.

C. SCOPE/METHODOLOGY

This thesis seeks to answer the questions of how to adapt our leadership, education and training, and other human resource management practices to meet the high tempo, high technology demands posed by the new concepts in *Joint Vision 2010*. The answers to these questions were obtained by synthesizing:

- (1) selected readings on modern leadership and management,
- (2) recent literature on the future operating environment, the future of conflict, and the revolution in military affairs,
- (3) the Skills, Knowledge, and Attributes for the field grade Army officer of the 21st Century as identified by the Science Applications International Corporation for the Army's OPMS XXI Task Force, and

¹¹ OPMS XXI Task Force, *Officer Personnel Management System XXI Final Report*, (1997), pp. iii-iv, 3-8.

- (4) the interview results of 15 active duty military officers ranging in rank from O-6 to O-10, 2 retired military officers (1 retired O-6 and 1 retired O-8), 2 senior level civilian Department of Navy officials, and 4 Professors from the Naval Postgraduate School.

D. BENEFIT OF THE STUDY/ORGANIZATION OF THE THESIS

This thesis contributes to a dialogue within the Navy about where we are going in terms of officer development and management. We need a shared vision of the naval officer of the future and we need processes that are designed to create that officer. This study presents one vision of the naval officers of 2020 and provides some recommendations on how to create and manage these officers.

In order to provide a foundation for looking at the future, Chapters II through V describe the present. Chapter II discusses several conceptual models useful as frameworks for analyzing the future Navy and implications for the future naval officer. Chapter III presents a picture of the Navy of today, while Chapter IV describes the naval officer of today. Chapter V discusses the current officer career management system.

Chapters VI through X discuss the future. Chapter VI provides a synthesized view of the future environment, while Chapter VII presents a brief picture of the Navy of 2020. In Chapter VIII, data and themes from the interviews conducted are presented. Chapter IX provides a vision of the naval officer of 2020. Lastly, Chapter X discusses major conclusions and provides recommendations for officer development and management. This chapter utilizes a 7 part human resource model to discuss the alignment of Navy human resource management practices with the direction we need to take to obtain the naval officer that will be needed to lead and manage in the future Navy.

II. CONCEPTUAL MODELS

A. OVERVIEW

This thesis uses 5 conceptual models to help analyze the future environment and technology's impact on the officer of the future. This chapter summarizes the key features of these models for further development in later chapters. The first model is the Systems Model which is used to portray the different elements of organizational design. The second is Mintzberg's organizational model that allows us to analyze how organizations integrate and synchronize work processes. The third is Roberts Organizational Configurations Model which is used to describe how public sector organizations relieve the natural tension between effectiveness and efficiency. The fourth is Nadler and Tushman's Congruence Hypothesis which is used to describe the relationship between the different elements of the organization in the Systems Model. Finally, the Navy Human Resource Management Model separates the human resource management functions that the Navy performs into 7 distinct areas.

B. THE SYSTEMS MODEL

The Systems Model views organizations as the sum of 5 interdependent design factors: (1) Task, (2) Technology, (3) Structure, (4) People, and (5) Processes/ Subsystems. These design factors are shaped by the organization's environment/context, the key success factors, and the system direction and strategy, and are intended to create a culture that leads first to outputs and then to outcomes.¹² See Figure 2-1.

1. Environment/Context

The first element in the Systems Model is the environment/context of the organization. In this element, the organization's external environment or the context within which the organization operates is analyzed. The intent is to determine whether the organization exists

¹² Nancy Roberts, "The Systems Model," Naval Postgraduate School, (Unpublished, 1998.)

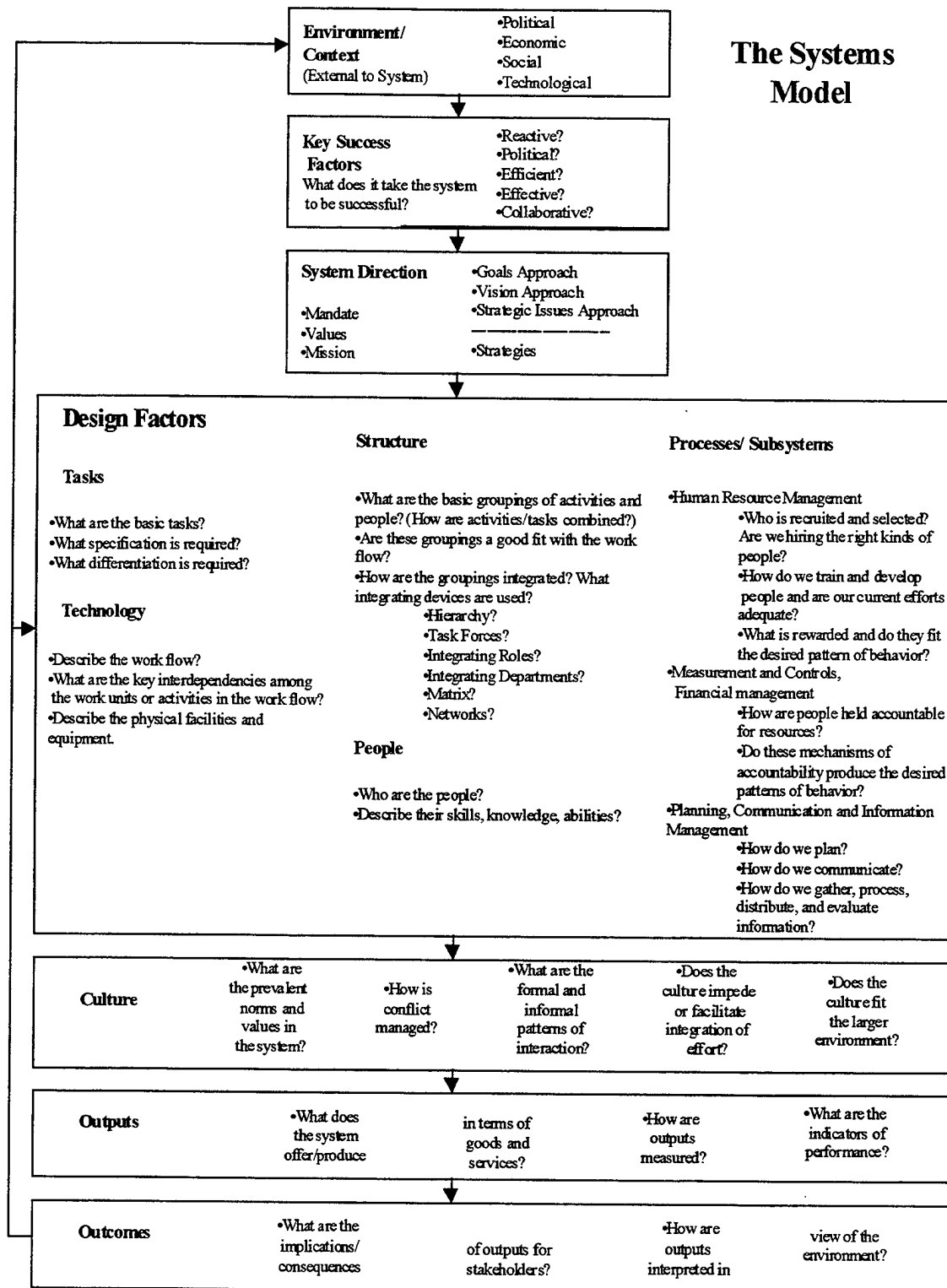


Figure 2-1. The Systems Model (Source: Nancy Roberts, Naval Postgraduate School, 1998)

in a relatively stable environment or it exists in a complex, uncertain environment. In addition, the environment may be described as political, economic, social, or technological. These different external environments lead to different successful configurations for organizations.

2. Key Success Factors

What does it take for a system to be successful? The answer is largely dependent on the environment/context of the organization. Organizations in political environments are typically successful if they respond to stimuli in a very political manner. For organizations in stable environments, the typical key success factor is efficiency. In uncertain, complex environments, the key success factor is often effectiveness usually gained through innovation. In environments that are uncertain and where resources are scarce, collaboration is the typical key success factor for through collaboration, both effectiveness and efficiency are optimized. The answer to this question of what it takes for a system to be successful is critical to Robert's Organizational Configuration Model which will be discussed later in this chapter.

3. System Direction/Strategy Formulation

The next element in organizational design is the system direction/strategy formulation element. It derives from the previous two elements and it drives the development of the design factors. There are many approaches to systems direction/ strategy formulation, all of which are beyond the scope of this thesis. The important point in this context is the need for a system to have a direction to be successful and the obvious fact that the system's direction needs to dictate the formulation of the design factors.

4. Design Factors

The design factors are the aspects of an organization that form its culture. They include tasks, technology, structure, people and process as defined below:

- Tasks refers to the basic jobs/tasks of the organization including the specification and differentiation that is required for successful completion of the task.
- Technology refers to the work flow of the organization, the key interdependencies among the work units or activities in the work flow, and the physical facilities and equipment used to accomplish the work.

- Structure refers to the basic grouping of activities and people, how these groupings fit the work flow, and how these groupings are integrated through either: hierarchy, task force, integrating roles, integrating departments, matrices, or networks.
- People deals with who the people are and what skill, knowledge, abilities, and attributes they need to be successful.
- Process/Subsystems refer to:
 1. financial management/measurement/controls which deal with how people are held accountable for resources, how unit performance is measured, and how budgeting is conducted.
 2. human resource management pertains to how people are accessed into the organization, trained and developed, and how they are rewarded.
 3. planning/communication/information management deals with how the organization plans, how it communicates, and how it gather, processes, distributes, and evaluates information.

5. Culture/Outputs/Outcomes

Culture is the result of the previous organizational elements and leads to both outputs and outcomes. It pertains to the prevalent norms and values of the system, and how conflict is managed within the system. It deals with both formal and informal patterns of interaction and whether the culture impedes or facilitates integration of effort. Output is what the system offers or produces in terms of goods and services. It can be tangible depending on how results are measured, and it serves as an indicator of performance for the system. Outcomes refer to the implications or consequences of the outputs for the stakeholders, and how these outputs are interpreted in view of the stakeholders' environment.

C. MINTZBERG'S ORGANIZATIONAL MODEL

According to Henry Mintzberg, organizations can be divided into five components: the operating core, the strategic apex, the middle line, the technostructure, and the support staff.

The operating core consists of the members of an organization "who perform the basic work related directly to the production of products and services." The operating core performs four major tasks: (1) they secure the inputs for production, (2) they transfer the inputs into outputs, (3) they distribute the outputs, and (4) they provide direct support to the input, transformation, and output functions. The strategic apex are the people with overall responsibility for the organization. Their duties are (1) direct supervision, (2) interaction with the organizations environment, and (3) development of the organizations strategy. The strategic apex is joined with the operating core by a chain of middle line managers. These middle line managers have the job of direct supervision of the operating core, liaison with the other middle line managers and the strategic apex, and development of strategy for his unit. In simple and small organizations, the middle line is not necessary, but in larger more complex organizations the middle line is essential to limit the manager's span of control to manageable proportions. The fourth component of an organization is the technostructure. The technostructure serves the organization by affecting the work of others. They design the work and train the people who do the work, but do not do the main work of the organization, themselves. The final part of the organization is the support staff. The support staff are specialists that exist to provide support that is outside the operating work flow. Their jobs run the gamut from legal counsel to personnel management.¹³ Mintzberg created a simple diagram to illustrate the relationship between the five components. See Figure 2-2.

Mintzberg further develops his model by categorizing organizations by their dominant component. The five major categories according to Mintzberg are the simple structure, the machine bureaucracy, the professional bureaucracy, the divisionalized form, and the adhocracy. The simple structure is based on direct supervision in which the strategic apex is the dominant

¹³ Henry Mintzberg, *Structure in Fives: Designing Effective Organizations*, (Prentice Hall: New Jersey, 1992), pp. 10-18.

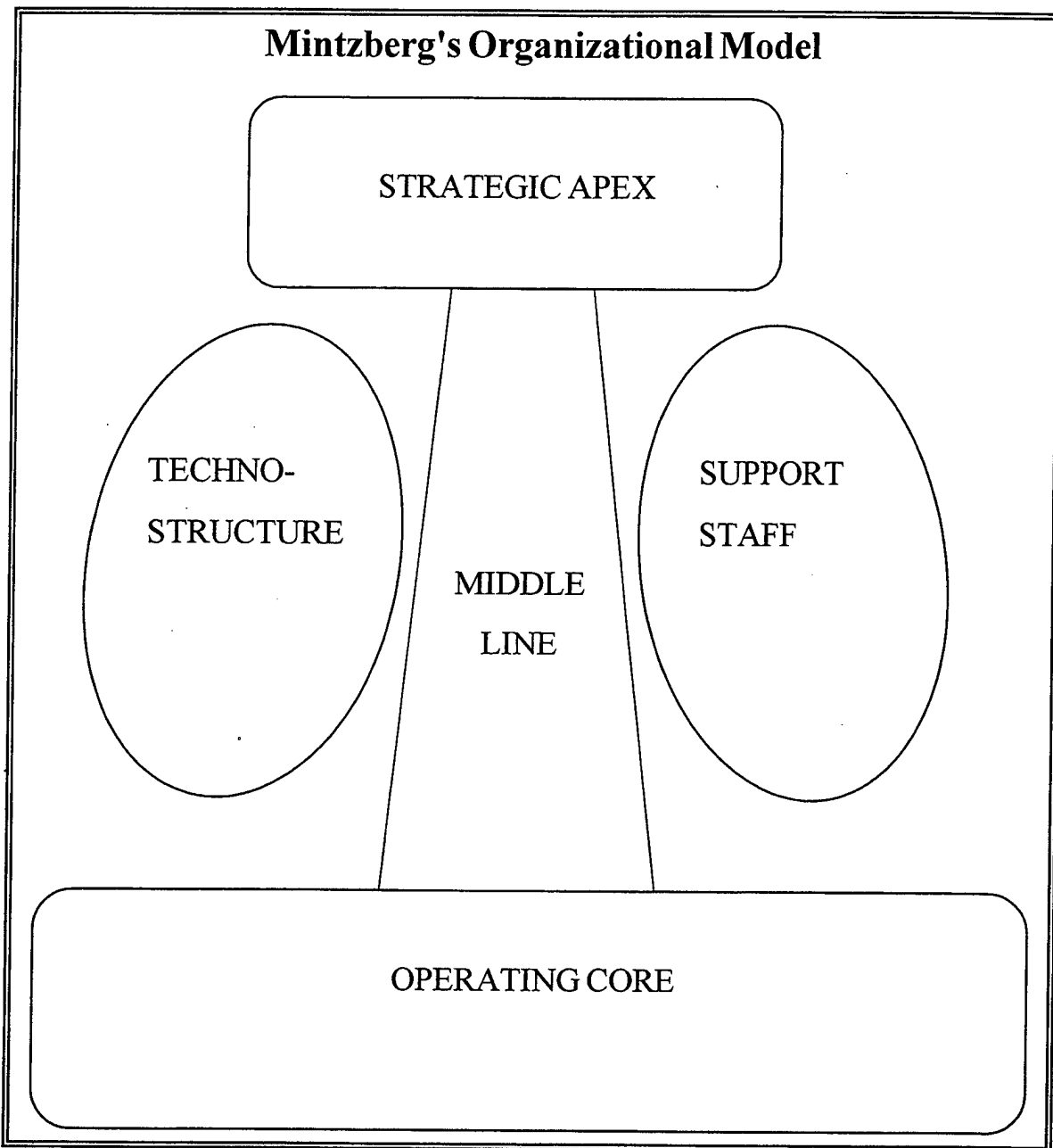


Figure 2-2. Mintzberg's Organizational Model (Source: Henry Mintzberg, *Structure in Fives: Designing Effective Organizations*, 1992)

component. The machine bureaucracy is based on the standardization of work processes in which the technostucture is the dominant component. The professional bureaucracy, on the other hand, is based on the standardization of skills in which the operating core is the dominant

component. The fourth category, the divisionalized form, is based on the standardization of outputs in which the middle line is the dominant component. The fifth and final category is the adhocracy. The Adhocracy is based on mutual adjustment in which the support staff sometimes with the operating core is the dominant component.¹⁴ An important thing to note from this discussion, however, is that there are no pure organizational forms. One organization can exhibit the traits of more than one category, but in most cases there is one form that dominates.

D. ROBERT'S ORGANIZATIONAL CONFIGURATION MODEL

General managers face two basic challenges when leading and managing public bureaus. Leaders and managers are expected to strive for organizational efficiency whereby results are produced with the minimum expenditure of resources. At the same time, they are expected to be effective in areas where managers must be more concerned with doing the right thing. Efficiency is created in part through focus, precision, repetition, discipline, and control whereas effectiveness "typically comes from an understanding and interpretation of the external environment as it signals what ongoing adaptations are required in organizational technology, knowledge, strategy, and values." Both of these organizational attributes are required for successful performance, but they tend to interfere with each other especially in the competition for scarce resources as "effectiveness thrives on exploration and experimentation, but efficiency attempts to drive them out."¹⁵

From this conflict of effectiveness versus efficiency, leaders have developed four basic management configurations. In this context, configuration refers to a coherent pattern or cluster of organizational environments, strategies, structures, processes, cultures, and outcomes that commonly occur together. As shown in Figure 2-3, these configurations are the

¹⁴ Ibid., 23.

¹⁵ Nancy Roberts, "Public Deliberation: An Alternative Approach to Crafting Policy and Setting Direction," *Public Administration Review*, (March/April 1997), p. 124.

political/reactive configuration, the directive configuration, the adaptive configuration, and the generative configuration.¹⁶

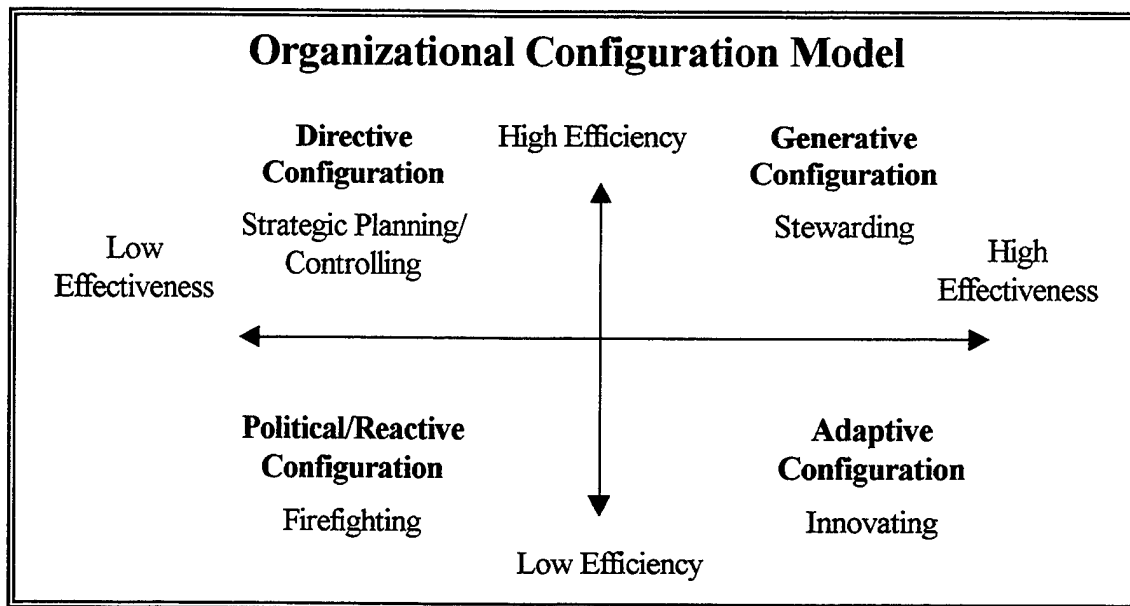


Figure 2-3. Four Approaches to Public Sector General Management (Source: Nancy Roberts, "Public Deliberation: An Alternative Approach to Crafting Policy and Setting Direction," *Public Administration Review*, (March/April 1997) p. 125.)

1. Political/Reactive Configuration

In the political/reactive configuration, the manager "relieves the tension between efficiency and effectiveness by reducing the pressure on each dimension." The general manager does not seek to achieve optimal effectiveness nor optimal efficiency, nor does he seek to reconcile the competing demands of the two dimensions. He, inconsistently and in a disjointed pattern, shifts his efforts from one dimension to the next. One minute he seeks efficiency, the next, he seeks effectiveness depending on which one is in his own self-interest. Hierarchical structures are often in place to integrate effort, but these structure are often ignored as informal patterns, that are much different from the formal hierarchy, dominate the work place. There is

¹⁶ Nancy Roberts, "Organizational Configurations: Four Approaches to Public Sector General Management, " Naval Postgraduate School, Unpublished, (January 1998,) pp. 3-19.

no vision in this configuration as there is no consensus on system direction/strategy, and consequently, there is no consensus on the tasks that the organization is to perform. This configuration is often equated to the metaphor of firefighting as the members of the organization shift their efforts from crisis to crisis because there is no set of coherent, integrated policies to guide the organization..¹⁷ The purpose of political/reactive configuration is provide enough maneuvering room for the general manager to react to politics or play politics because this is the only way to succeed in some highly political environments.¹⁸ Therefore, the key success factors for this configuration are reactivity or politics.

2. Directive Configuration

General managers in the directive configuration "resolve the tension between efficiency and effectiveness by designing bureaus for optimal efficiency and minimal effectiveness." They face relatively stable environments and achieve efficiency by running their organization as a machine bureaucracy. Leadership avoids questions of adaptation and experimentation because that would force a reexamination of current operations. The managers efforts are centered around internal order and maintaining control. Order is maintained by extending influence externally to minimize threats. Jobs are formalized and the work is coordinated through standardized procedures. Centralized hierarchical structures are used to integrate efforts. Change is resisted, but if necessary, it is accomplished by top-down directives to change work routines or standard operating procedures.¹⁹

3. Adaptive Configuration

In the adaptive configuration, general managers design their organizations for optimal effectiveness. Their major concern is adaptation to the complex and hyper-competitive external environment because that is the principle way to achieve effectiveness. Efficiency is not the driving concern. Leaders take the role of champion of innovation rather than that of controller. Organizations in this configuration are typically decentralized and organized around project

¹⁷ Roberts, "Public Deliberation: An Alternative Approach to Crafting Policy and Setting Direction," p. 125.

¹⁸ Roberts, "Organizational Configurations: Four Approaches to Public Sector General Management," p. 19.

¹⁹ Roberts, "Public Deliberation: An Alternative Approach to Crafting Policy and Setting Direction," p. 125.

work and cross-disciplinary teams. Leaders rely on general visions rather than specific goals to guide the organization. Innovation and entrepreneurship are highly rewarded.²⁰ This configuration is often referred to in management literature as an "adhocracy."

4. Generative Configuration

General managers in the generative configuration "are challenged to be managers of organizational tensions and masters of paradox. No longer content with trade-offs between efficiency and effectiveness, they search for ways to reconcile what appears to be competing expectations." The role of the leader in these organizations is to help his or her subordinates find some underlying framework or solution to problems that would resolve the paradoxes of modern organizations. The keys to success in this configuration are the promotion of generative learning or the "learning that develops people's capacity to create new solutions to old problems," and collaborations among internal and external stakeholders to address the paradoxes that are formed by attempting to reconcile effectiveness and efficiency. Through generative learning, effectiveness is achieved, while efficiency is achieved through the integration achieved by collaboration. Organizations that have approached this new configuration have been described as "boundaryless" network organizations, cellular organizations, virtual organizations, and learning organizations.²¹ Table 2-1 offers a comparison of the 4 configurations.

E. NADLER AND TUSHMAN'S CONGRUENCE HYPOTHESIS

Nadler and Tushman's Congruence Hypothesis states that

"other things being equal, the greater the total degree of congruence or fit among various components [design factors], the more effective will be the organization- effectiveness being defined as the degree to which actual organizational output is similar to expected or planned, as specified by strategy...Therefore, the question is not how to find the 'one best way of

²⁰ *Ibid.*

²¹ Nancy Roberts, "Public Deliberation: An Alternative Approach to Crafting Policy and Setting Direction," p. 125, and Nancy Roberts, "Organizational Configurations: Four Approaches to Public Sector General Management," pp. 17-19.

Comparison Across Four Configurations				
	Reactive/Political	Directive	Adaptive	Generative
Purpose	react to politics play politics	order, minimize uncertainty	innovate	learn
Organizational Type	neutral organization; political organization	machine bureaucracy	adhocracy	network, virtual organization
External Environment	competing coalitions, stakeholder conflicts, regulated environment	stable, simple	hypercom- petitive; complex	turbulent, complex; hard to separate internal and external elements
Direction Setting and Planning	muddling through; piecemeal, disjointed planning; partisan mutual adjustment	top-down, comprehensive hierarchy of goals and strategies; sequential planning process	vision and values drive from top; strategies emerge throughout organization based on experi- mentation and groping along;	strategic issues identified by top; from stakeholder collaborations
Basis of Decision Making	responsive to political authority; political decision making; garbage can process	rational, technical analysis	rational analysis in technical core; politics at mid- level and at strategic apex	dialogue and deliberation of strategic issues; co-learning
Change Initiated By	shifting political alliances	strategic apex sets new course	finding new opportunities through explorations and experiments	stakeholder collaboration
Organizational Structure	none characteristic unless political coalition establishes temporary authority	mechanistic, centralized, functional	organic, decentralized, project management	cellular forms of organizing; multi functional, self - organizing teams; partnerships, alliances

Table 2-1. Comparison Across Four Configurations (Source: Nancy Roberts, "Organizational Configurations: Four Approaches to Public Sector General Management, "Naval Postgraduate School, unpublished, January 1998, p. 35.)

Comparison Across Four Configurations (CONT)

	Reactive/Political	Directive	Adaptive	Generative
Organizational Tasks/Jobs	ill defined, fluid, determined by associations	standardized, specialized, formalized	expert based, non-standardized to support the project/program	cross training; jobs expanded & enlarged to empower self-managed teams
Organizational Coordination	through interplay of politics and coalitions	through hierarchy, specialized work, sops, & routines	through liaison roles, coordinating committees, task forces, and mutual adjustment	through information sharing among network members
Implementation	unaligned design elements; lack of coherence among organizational parts	top-down alignment of design elements with direction	alignment with vision through experiments	alignment between strategic issue and action plan
Controls & Evaluation	based on inputs and pleasing political authority	based on rules, standardized inputs required per unit of output	based on feedback linked to vision and outcomes and customer satisfaction	based on norms for learning; feedback linked to strategic issue, outcomes & stakeholder satisfaction
Organizational Norms	appearance of responsiveness to political authority;	order and stability;	team work, creativity, invention, flexibility	active listening, collaboration, appreciation of differences
Role of General Manager	crisis manager or games man	planner, controller	visionary, champion of innovation	steward, teacher, designer
Role of Organizational Member	firefighter or political actor	"soldier"	entrepreneur, innovator	co-learner
Central Skills	manages crisis, bargains and negotiates, forms coalitions, conducts power analysis, builds a power base	conducts rational analysis & cost benefit analysis	inspires others to action; builds enthusiasm and commitment; articulates vision; manages conflict	focuses on key questions, structures and facilitates dialogue and deliberations; evokes trust in the process; leads large-group collaborations

Table 2-1. Comparisons Across Four Configurations (Cont.) (Source: Nancy Roberts, "Organizational Configurations: Four Approaches to Public Sector General Management, "Naval Postgraduate School, unpublished, January 1998, p. 36.)

managing,' but how to find effective combinations of components [design factors] that will lead to congruence among them.²²

Congruence in this context means the degree to which the needs, goals, objectives, and structures of one organizational element or design factor are consistent with the needs, goals, objectives, and structures of other organizational elements or design factors. Simply put, the design factors and organizational elements as described earlier in the systems must be congruent for the organization to reach its optimal level of performance. Therefore, this charges managers with creating processes that are congruent with the entire system.

F. NAVY HUMAN RESOURCE MANAGEMENT MODEL

In general, a human resource management system acquires people, moves them through the organization over time, and eventually transitions them out of the organization. Harry Thie and Roger Brown contend that the military human resource management system has five primary functions: accessing, promoting, developing, assigning, and transitioning.²³ Accessing includes attracting officer candidates into the system, screening them, and indoctrinating them into the culture of the Navy, promotion involves the advancement of these individuals through the structure of the organization. Development pertains to the acquisition of knowledge, skills, ability, and attitudes that are desired by the organization. Assigning or detailing distributes officers across the organization into billets (jobs), and finally, transitioning moves people out of the organization into the civilian sector or into retirement. The Thie and Brown model however seems to neglect two important aspects of the military's human resource management system: (1) the pecuniary and non-pecuniary compensation system and (2) the performance evaluation system. I am adding the compensation function and the evaluation function to the Thie and Brown model and will use it in chapter IV to discuss the Navy's officer career management system.

²² Nadler and Tushman, *Strategic Organizational Management*, (Scott Foresman and Company, Glenview IL, 1988), pp. 29-30.

²³ Thie and Brown, pp. 72-74.

III. THE NAVY OF TODAY

A. OVERVIEW

In order to have a vision of the future, one must have a firm grasp on the present. This chapter will present a picture of the Navy of today using the models which were introduced in Chapter II as analytical tools.

The Navy of today operates firmly within the realm of the Directive Configuration. Traditionally, the military has been built on discipline and order and the Navy has been no exception. The structure of the Navy is mechanistic, centralized, and functional. Operations are coordinated through an extensive vertical hierarchy (chain of command), standard operating procedures, and routines. The Navy's planning and direction setting is conducted using a comprehensive hierarchy of goals and strategies that come from the strategic apex of the organization. Decisions are based on rational technical analysis originating from the technostructure.

Using the Systems Model, this chapter will discuss the design factors for the Navy of 1998 which place it so firmly in the Directive Configuration. First, I will discuss the tasks that naval officers perform as delineated by the National Military Strategy and the Navy's *Forward... From the Sea* series of strategy documents. This will be followed by a discussion of the technology/work flow of the Navy with regards to doctrine and warfighting equipment. Finally, I will discuss the structure of the Navy. Chapter IV will contain a description of the naval officer of today with regards to skill, knowledge, abilities, and attributes. The Navy's Processes/Subsystems in particular the Navy's human resource management system will be discussed in Chapter V.²⁴

²⁴ The Measurement and Controls, Financial Management and to some degree the Planning, Communication, and Information Management Processes of the Navy are omitted from this analysis as they are beyond the scope of this study. This is not to suggest that they are unimportant or that they need not be in congruence with these other design factors. All parts of the system need to be in congruence. Work in these areas will be left to others.

B. THE TASKS

The tasks of the Navy are delineated in the National Military Strategy and the Navy Strategy as documented in the *Forward... From the Sea* series of strategic documents. This section will review these tasks.

1. The National Military Strategy

The National Military Strategy provides the overarching rationale for military capabilities and forces and is derived from the president's national security strategy, the projected international security environment, and domestic fiscal constraints. The current national military strategy is delineated in the Secretary of Defense's 1997 *Report of the Quadrennial Defense Review* and the Chairman of the Joint Chief of Staff's *National Military Strategy: Shape, Respond, Prepare Now - A Military Strategy for a New Era*. According to the *Quadrennial Defense Review (QDR)*, the national military strategy is to "help shape the international security environment in ways favorable to U.S. interests, respond to the full spectrum of crises when directed, and prepare now to meet the challenges of an uncertain future."²⁵ The key elements of this strategy are **shaping, responding, and preparing**.

Shaping the international environment includes (1) promoting stability, (2) preventing or reducing conflicts and threats, and (3) peacetime deterrence. The promotion of stability is to be achieved through peacetime engagement activities such as international exercises, foreign military sales, the International Military Education and Training program and information sharing. These activities are designed to "promote regional stability, increase the security of allies and friends, build coalitions, and ensure a more secure global environment."²⁶ The prevention or reduction of conflicts and threats is to be achieved through civilian assistance programs and arms control measures with the goal of reducing the need for greater military effort later. Peacetime deterrence involves "preventing potential adversaries from taking

²⁵ Department of Defense, *Report of the Quadrennial Defense Review*, (1997), p. 3-2.

²⁶ Department of Defense, *National Military Strategy: Shape, Respond, Prepare Now: A Military Strategy for a New Era*, (1997), p. 3-2.

aggressive actions that threaten our interests, allies, partners, or friends."²⁷ Deterrence is to be accomplished by the strategic positioning of conventional and strategic forces in order to demonstrate the U.S. Armed Forces ability to rapidly project and concentrate military power.²⁸

Responding to the full spectrum of crises when directed, includes (1) deterring aggression and coercion in a crisis, (2) conducting smaller scale contingency operations, and (3) fighting and winning major theater wars. Deterring aggression and coercion in a crisis is to be accomplished through enhancing our warfighting capability in a theater, communicating U.S. intentions, enforcing sanctions, and conducting limited strikes. The goal of deterring aggression is again to reduce the need for greater military effort later. Conducting smaller scale contingency operations "encompasses the full range of joint military operations beyond peacetime engagement activities but short of major theater warfare and includes: show-of-force operations, interventions, limited strikes, non-combatant evacuation operations, no-fly zone enforcement, peace enforcement, maritime sanctions enforcement, counterterrorism operations, peacekeeping, humanitarian assistance, and disaster relief."²⁹ Fighting and winning major theater wars is the most stressing military requirement for the U.S. military in that it includes the ability "to deter and defeat large-scale, cross border aggression in two distant theaters in overlapping time frames, preferably in concert with regional allies."³⁰ The key capabilities in accomplishing this strategic requirement according to both the *QDR* and the *National Military Strategy* are (1) the ability to "rapidly defeat initial enemy advances short of their objective in two theaters in close succession, one followed almost immediately by another" and (2) the ability "to achieve our war aims against an adversary who uses or threatens to use NBC weapons, information warfare, terrorism, or other asymmetric means against us."³¹

Preparing now to meet the challenges of an uncertain future has four main parts. (1) The first part is the pursuit of a focused modernization effort in order to replace aging systems and incorporating cutting-edge technologies into the force to ensure continued U.S. military

²⁷ *Ibid.*

²⁸ *Ibid.*

²⁹ *Report of the Quadrennial Defense Review*, p. 3-4.

³⁰ *Ibid.*

superiority. Second, the military needs to continue to exploit the "Revolution in Military Affairs" (RMA) in order to improve the U.S. military's ability to perform near-term missions and meet future challenges. Third, the military needs to exploit the "Revolution in Business Affairs" to radically reengineer Department of Defense (DoD) infrastructure and support activities. Finally, the military needs to insure or hedge against unlikely, but significant, future threats in order to manage risk in a resource-constrained environment.³²

2. The Nation's Naval Strategy

While the national military strategy directs the efforts of the military at large, the Navy is directed by strategic concepts delineated in *...From the Sea* (1992), *Forward...From the Sea* (1994) and *Forward...From the Sea: The Navy Operational Concept* (1997). See Table 3-1 for a summary of the tasks delineated in these strategic documents.

a. *...From the Sea* (1992)

...From the Sea (1992) refocused the military from cold war maritime strategies to the "littoral" operating environment. The key, according to *...From the Sea* to this new "littoral" environment, is the "Naval Expeditionary Force- Shaped for Joint Operations, Operating Forward From The Sea, and Tailored for National Needs." Naval Expeditionary Forces as envisioned by *...From the Sea* are to consist of a tailored force of:

1. Aircraft Carriers and Naval Tactical Air Wings
2. Submarines
3. Amphibious Ships with embarked Marines
4. Maritime Patrol Aircraft
5. Surface Combatants
6. Mine Warfare Forces
7. Naval Special Warfare Forces

The core tasks (operational capabilities) of these expeditionary forces are Command, Control,

³¹ *Ibid.*, p. 3-5.

³² *Ibid.*, p. 3-6.

The Navy's Tasks Today

...From the Sea (1992)

Command Control

Surveillance

- collect intelligence
- disseminate intelligence
- deny/manage our enemies intelligence
- target and direct strikes

Battlespace Dominance

- maintain our access
- deny enemy access

Power Projection

- application of offensive power

Sustainment

- supply
- maintenance

Forward...From the Sea (1994)

Peacetime Forward

Presence

- coalition building
- humanitarian assistance
- naval presence
- conventional deterrence
- TBMD
- strategic deterrence

Crisis Response

- prevention of conflict escalation

Regional Conflict

- serve as transition force for land based units:
 - a. blunting of initial assault
 - b. seizure and defense of advanced land bases
 - c. enabling deployment of land based forces
 - d. provision of initial command and control capabilities

Joint and Combined Operations

- power projection

Forward...From the Sea (1997)

Peacetime Engagement

- ensure freedom of navigation
- support compliance with international law of the sea
- humanitarian assistance
- naval presence
- coalition building

Deterrence and Conflict Prevention

- conventional deterrence
- strategic deterrence
- prevention of conflict escalation
- ability to halt initial enemy aggression
- information dominance
- TBMD

Fight and Win

- halting of fait accompli strategies
- serve as transition force for land based units
- power projection/precision naval fires
- TBMD
- sanction enforcement

Table 3-1. The Navy's Tasks as Delineated by the *...From the Sea* Series of Strategic Documents

and Surveillance, Battlespace Dominance, Power Projection, and Force Sustainment.

- Command, control and surveillance refers to the ability to collect intelligence through overt and covert surveillance, the dissemination of information to commanders, the

denial and/or management of information to our enemies, and the targeting and direction of strikes against our enemies from a variety of land, sea, and air platforms.

- Battlespace dominance pertains to the maintaining of access from the sea to permit the effective entry of equipment and resupply while denying access to our adversaries.
- Power projection is the application of precise offensive power in the form of bombs, missiles, shells, bullets, and bayonets.
- Finally, sustainment is the ability of naval forces to supply and maintain forward deployed forces regardless of service.³³

The important thing to note about these core tasks is that these capabilities are the foundation for the more advanced tasks that are identified by both *Forward...From the Sea* (1994) and *Forward...From the Sea: The Naval Operational Concept* (1997).

b. Forward...From the Sea (1994)

Forward...From the Sea (1994) expounded on the concept of Naval Expeditionary Forces introduced in *...From the Sea*. The Naval Expeditionary Force as envisioned by *Forward...From the Sea* consists of naval "building blocks" in the form of aircraft carrier battle groups with multi-purpose naval tactical aviation wings and the amphibious ready groups with special operations capable Marine Expeditionary Units. These forces are charged with peacetime forward presence operations, crisis response, regional conflict, and joint and combined operations.

- Peacetime forward presence operations include peacetime coalition building, humanitarian assistance, naval presence, conventional deterrence with theater ballistic missile defense (TBMD), and strategic nuclear deterrence.
- Crisis response pertains to deterrence of aggression through the rapid response of forward deployed forces which provide theater commanders with a variety of flexible options.

³³ Department of the Navy, *...From the Sea*, (1992), pp. 2, 6-9.

- Regional conflict relates to the Navy's capability of serving as a transition force for land based forces early in a conflict. The tasks implicit in this capability are the blunting of the initial enemy assault, the seizure and defense of advanced land bases, the enabling of the flow of land based air and ground forces to the scene, and the provision of initial command and control capabilities.
- Finally, joint and combined operations refers to the integration of the Navy's power projection capabilities with the effort of the other services and allied nations in major regional conflicts.³⁴

c. Forward...From the Sea: The Navy Operational Concept (1997)

Forward...From the Sea: The Navy Operational Concept (1997) updates the tasks and concepts espoused in the two previous strategic documents especially with its emphasis on operational primacy in the littoral environment. It maintains the focus on carrier battle group and amphibious ready group Naval Expeditionary Forces, but at the same time it acknowledges the benefits of mission tailored task groups consisting of individual units or groups of units such as maritime interception forces. In addition, it couches the tasks of the Navy in the framework of the National Military Strategy namely peacetime engagement, deterrence and conflict prevention, and fight and win.

- Peacetime engagement in this case refers to ensuring freedom of navigation on international trade routes, supporting United States efforts to bring excessive maritime claims into compliance with the international law of the sea, providing humanitarian assistance, naval presence, and peacetime coalition building.
- Deterrence and conflict prevention pertains to the signaling of United States capabilities and resolve to friend and foe. It encompasses conventional deterrence with forward deployed forces, strategic deterrence, prevention of conflict escalation through shows of force, the ability to halt initial aggression and therefore prevent aggressors from

³⁴ Department of the Navy, *Forward...From the Sea*, (1994), pp. 3-8.

achieving a fait accompli, information dominance through the Navy's intelligence, surveillance and reconnaissance capabilities, and force protection through TBMD.

- Fight and win is the concentration of "combat power from dispersed, networked forces." It encompasses the halting of fait accompli strategies early in the conflict, the enabling of joint campaigns as the Navy serves as a transition force for land based units, the delivering of "precision naval fires to accomplish strategic, operational, and tactical objectives" of joint and combined operations, the sustained protection of joint and coalition forces ashore through TBMD and the enforcement of sanctions after the joint/combined campaign concludes.³⁵

C. TECHNOLOGY

Technology in this context refers to both the work flow of the Navy and the tangible equipment of the Navy. The work flow of the Navy is governed by Naval Doctrine which in turn governs how the Navy uses its tools to complete its tasks. This section will summarize Navy doctrine and it will identify the technological tools that the Navy utilizes to complete the tasks assigned to it.

1. Doctrine

"Naval Doctrine is the foundation upon which our tactics, techniques, and procedures are built. It articulates operational concepts that govern the employment of naval forces at all levels."³⁶

Doctrine is the conceptual starting point from which naval forces develop solutions and options to address the specific warfighting demands. Naval doctrine is delineated in the Naval Doctrine Publication Series and is designed to form "a bridge between the naval component of our nation's military strategy and our tactics, techniques, and procedures."³⁷ As with the nation's naval strategy, naval doctrine emphasizes the naval expeditionary force and the "littoral" operating environment. In addition, naval doctrine expands on the navy's core

³⁵ Department of the Navy, *Forward...From the Sea: The Naval Operational Concept*, (1997), pp. 2-7.

³⁶ Department of the Navy, *Naval Doctrine Publication 1: Naval Warfare*, (1994), p. ii.

³⁷ *Ibid.*

capabilities of command and control, battlespace dominance, power projection, and force sustainment.

a. Command and Control

Command and Control is the foundation of unity of command and as such encompasses the gathering, processing, and distribution of information vital to the conduct of military planning and operations.³⁸

The process is modeled using the Observe, Orient, Decide, Act Loop or "OODA Loop" which was developed by Colonel John R. Boyd, USAF (Ret) (1987). In the "OODA Loop", the decision maker starts in the observation stage where he senses and processes the environment to develop a common tactical picture. The next stage is the orientation stage whereby the decision maker derives knowledge from the common tactical picture to develop situational awareness. The third stage is the decision stage in which the decision maker makes the decision and comes up with a plan in the form of commander's intent and/or orders. The final step is the action step whereby the commander's forces execute the plan in the battlespace.³⁹ See Figure 3-1.

Command and Control Doctrine stresses two decision making theories (1) the analytical process and (2) the intuitive process. The analytical process according to doctrine involves generating options, identifying criteria, evaluating criteria, and rating each option according to the criteria. This should be used for deliberate planning prior to military action. The Intuitive approach "relies on an experienced commander's ability to recognize the key elements of a problem, rapidly integrate them, and make a proper decision." This approach is "more appropriate for the fluid, rapidly changing environment of combat, when time and uncertainty are critical factors."⁴⁰

In addition to two decision making theories, there are two methods of control: (1) detailed control and (2) mission control. Detailed control is centralized control in which the

³⁸ *Ibid.*, p. 61.

³⁹ Department of the Navy, *Naval Doctrine Publication 6: Naval Command and Control*, (1995), p. 18-19.

⁴⁰ *Ibid.*, pp. 24-25.

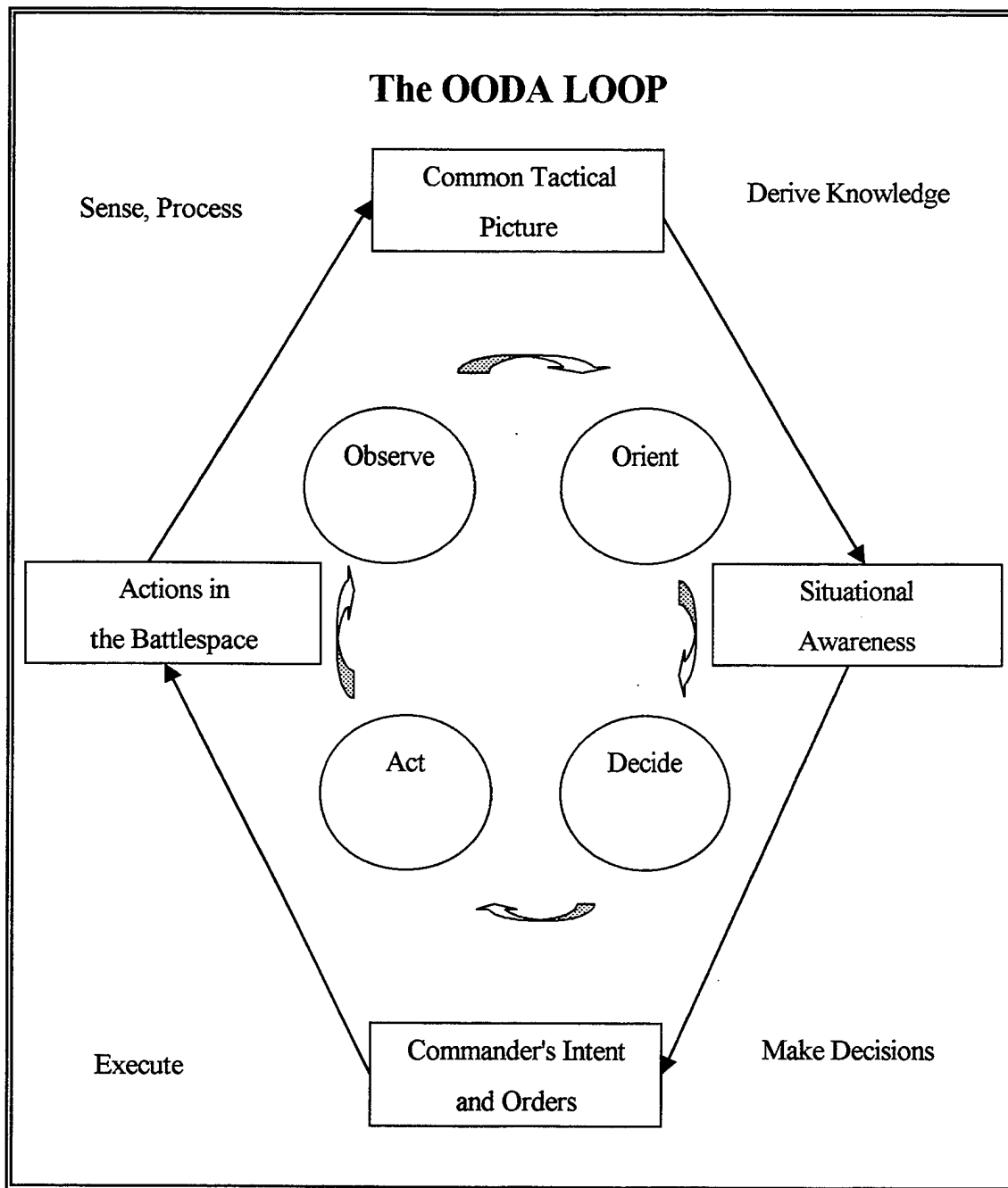


Figure 3-1. The "OODA Loop" developed by Colonel John R. Boyd (1987) (Source: U.S. Department of the Navy, *Naval Doctrine Publication 6: Naval Command and Control*, 1995, pp. 18-19.)

commander gives explicit orders and plans. It emphasizes vertical information flow, with information flowing up the chain of command and orders flowing down the chain of command.

Mission control, on the other hand, is decentralized and flexible. The commander directs the actions of his subordinates by imparting the mission requirements using succinct orders and then allows his subordinates freedom of action. According to doctrine, neither method is appropriate for every occasion. Detailed Control is more appropriate in performing precise tasks of a technical nature while mission control is better suited for high tempo operations.⁴¹ Command and Control is accomplished through the technology of C4ISR Systems. The goal of achieving efficient Command and Control through technology is high tempo operations on the theory that combat is the hostile interaction of independent wills with independent decision and execution cycles or "OODA Loops." High tempo operations allow us "to set in motion a series of actions and reactions, each of which may expose- if only for a moment- a critical vulnerability of the enemy" with which we can exploit to defeat him.⁴² Control of Combat Tempo gives a tremendous advantage to the side that has it and is the center of command and control doctrine.

b. Battlespace Dominance

Battlespace dominance is the establishment of zones of superiority and is a key factor in the survival and combat effectiveness of our force. Modern battlespace is multi-dimensional. It encompasses air, surface, subsurface, land, space, and time. As such, battlespace dominance is achieved by detecting, identifying, targeting, and neutralizing any hostile force that approaches our own forces. It uses the command and control network to integrate the efforts of ships, submarines, aircraft, and ground forces.⁴³

⁴¹ *Ibid.*, pp. 26-27.

⁴² *Ibid.*, p. 57.

⁴³ *Naval Doctrine Publication 1: Naval Warfare*, pp. 63-64.

c. Power Projection

"Our ability to project high-intensity power from the sea is the cornerstone of effective deterrence, crisis response, and war."- *Naval Doctrine Publication 1: Naval Warfare*

In the absence of any serious threat to the nation's sea lanes, power projection in the "littoral" operating environment is the Navy's most important capability in both peace and war. Power Projection is the application of offensive military force against an enemy at a time and place of our choosing. Through power projection, the Navy can either deter aggression through forward presence in peacetime or carry the fight to the enemy in times of war. Naval doctrine dictates that the primary tools to accomplish power projection are aircraft carrier based strike aircraft, amphibious ready groups, sea launched precision guided munitions, special warfare forces, naval surface fire support, command and control warfare, and maritime prepositioning.⁴⁴ The building blocks of power projection are the carrier battle group and the amphibious ready group.

d. Force Sustainment

One of the requirements of any and all military operations is force sustainment. Force sustainment is "made possible by a logistic support system that has two major components: fleet based sustainment assets and strategic sustainment assets."⁴⁵ Fleet based sustainment assets include the combat replenishment ships, direct fleet support units, combat service support units, mobile repair units, and advanced logistic support hubs. Strategic sustainment is provided via sea and air by assets that are shared by all the services. Force sustainment is built around six core competencies: (1) supply, (2) maintenance, (3) transportation, (4) general engineering (construction battalions), (5) health services, and (6) others services which include administrative functions, security, and personnel support requirements.⁴⁶

⁴⁴ *Ibid.*, pp. 64-65.

⁴⁵ *Ibid.*, p. 68.

⁴⁶ *Ibid.*, pp. 68-70.

2. The Navy's Technological Tools

The Navy's primary technological tools are those identified by ...*From the Sea* for composition of Naval Expeditionary Forces namely:

1. Aircraft Carriers and Naval Tactical Air Wings
2. Submarines
3. Amphibious Ships with embarked Marines (Amphibious Ready Groups)
4. Maritime Patrol Aircraft
5. Surface Combatants
6. Mine Warfare Forces
7. Naval Special Warfare Forces

Table 3-2 provides the QDR mandated force size in terms of the aforementioned technological tools. The characteristics and capabilities of these tools are briefly described in Appendix A.

QDR Mandated Force Structure

Force Structure	Active/Reserve
Aircraft Carriers	11/1
Naval Tactical Air Wings	10/1
Amphibious Ready Groups	12
Surface Combatants	116
Fast Attack Submarines	50
Ballistic Missile Submarines	18
Naval Special Warfare Teams	8

Table 3-2. QDR Mandated Force Structure (Source: The Quadrennial Defense Review, pp. V-1 - V-3.)

D. STRUCTURE

Structure in this context refers to the basic groupings of activities and people, how these groupings are integrated, and what integrating devices are used. In analyzing the

structure of the Navy, I will utilize Mintzberg's organizational model which was introduced in Chapter II.

1. The Navy as a Machine Bureaucracy with Overlapping Hierarchical Structures

At first glance, many would consider the Navy to be a professional bureaucracy with standardized skills being the coordinating mechanism between units. To some degree this is true, but the dominant coordinating mechanisms within the Navy are first, written procedures and checklists originating from the technostructure and second, a hierarchical command structure. As such, the Navy operates more as a machine bureaucracy.

Due to the complex environment, the Navy operates with two overlapping hierarchical structures. These overlapping hierarchical structures are the product of the drive for jointness between the military services. The first hierarchical structure is "The Navy Bureaucracy" which is responsible for the organizing, training, equipping, maintaining, assigning, and supporting of naval forces for the nation. The second structure is "The Joint Bureaucracy" which is responsible for military operations. Consequently, "The Navy Bureaucracy" is the technostructure for "The Joint Bureaucracy." Both of these structures are primarily machine in nature.

In "The Navy Bureaucracy," the technostructure, in the form of systems commands and tactical development commands, tends to be the dominant component. These organizations create the procedures by which all work is accomplished in the operating core. The ships and squadrons in the fleet are standardized by the technostructure through manuals such as Naval Air Training and Operating Procedures (NATOPS), the Reactor Plant Manual, and a myriad of other manuals and publications. Ships and squadron are inundated with these manuals as they govern all aspects of the organization's work from anti-missile defense to changing a lube oil filter on a nuclear powered submarine.

"The Joint Bureaucracy" is also machine like in nature in that "The Navy Bureaucracy" serves as the technostructure and exerts a dominant influence in the how naval forces operate.

"The Navy Bureaucracy"

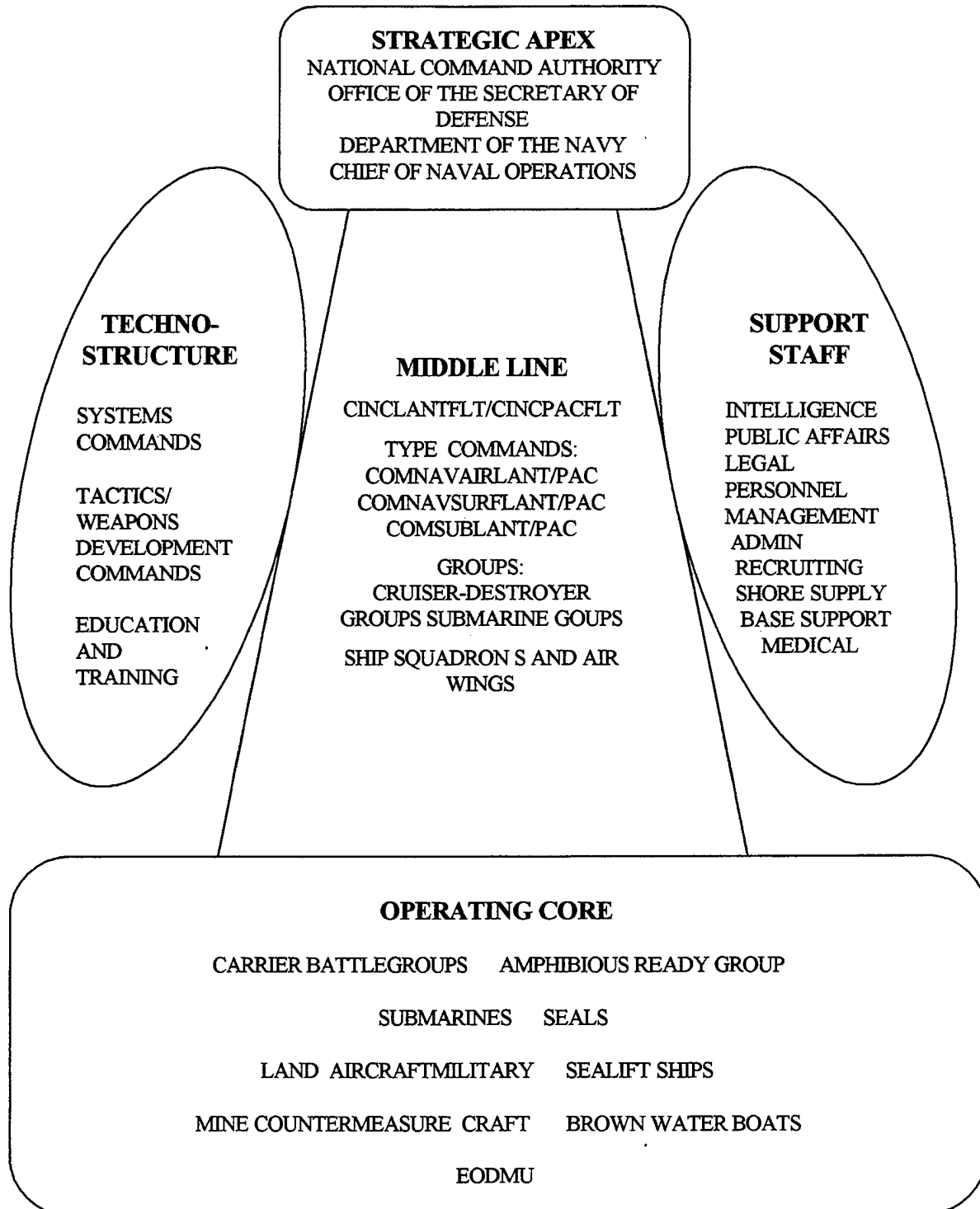


Figure 3-2. "The Navy Bureaucracy"

"The Joint Bureaucracy"

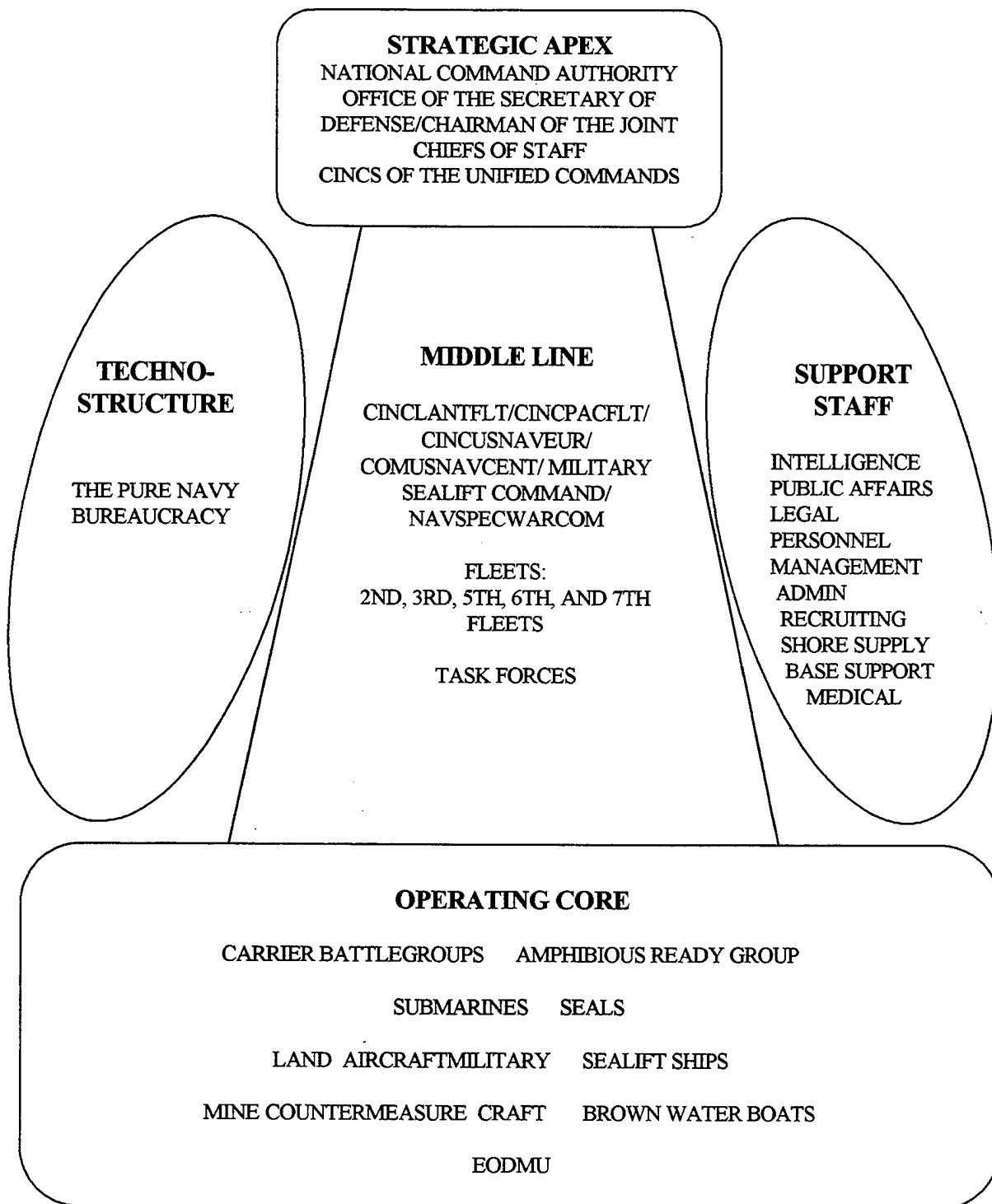


Figure 3-3. "The Joint Bureaucracy" (The differences from Figure 4 will appear in gray)

"The Navy Bureaucracy" dictates through doctrine and tactics how naval forces fight and operate. The Unified Commands do direct the operations and set the strategic direction in their area of responsibility, but it is the individual services that direct how the work is to be accomplished and indeed in some circumstances have overridden the desires of the Unified Command Commander-in-Chief (CINC) in deployment of forces. The overlapping hierarchical structures are graphically depicted in Figures 3-2 and 3-3. The following sections will describe the components of the Navy's hierarchical structure using Mintzberg's conceptual framework.

2. The Strategic Apex

The strategic apex for both structures starts with the National Command Authority which is by law the President of the United States and the Secretary of Defense. The Secretary of Defense is supported by his staff and in "The Pure Navy Bureaucracy" by the Secretary of the Navy and the Chief of Naval Operations and their respective staffs. The Goldwater-Nichols Act of 1986 modified "The Joint Bureaucracy" to bypass the Secretary of the Navy and the Chief of Naval Operations in operational matters. By law, the commanders in chief of the unified commands (the CINCs) report to the Secretary of Defense through the Chairman of the Joint Chiefs of Staff. As discussed previously, "The Navy Bureaucracy" is charged with the organizing, training, equipping, maintaining, assigning, and supporting of naval forces while the direction of operations is the purview of the strategic apex of "The Joint Bureaucracy" primarily the CINCs.⁴⁷ The number of naval officer billets in the strategic apex are given in Table 3-3.

3. The Middle Line

The middle line is the link that ties the strategic apex to the operating core. It provides the direct supervision that the strategic apex can not perform due to the size and dispersed nature of the Navy. In "The Navy Bureaucracy," the middle line starts with the two major fleets, Commander in Chief Atlantic Fleet and Commander in Chief Pacific Fleet

⁴⁷ Department of Defense, *The Joint Staff Officers Guide 1993*, (1993) pp. 2-3 - 2-36.

(CINCLANTFLT and CINCPACFLT), and then to the six type commands divided by major fleet and platform: air, surface, and submarine. After the type commands comes the groups and functional air wings and then at the bottom of the middle line is the ship squadrons and air type

Navy Officer Billets in the Strategic Apex		
Organization	Navy Officer Billets	% of Total Navy Officers Billets
Office of the Secretary of Defense	142	.25%
Office of the Secretary of the Navy	167	.29%
Office of the Chief of Naval Operations	935	1.6%
The Joint Staff	351	.61%
9 Unified Commands	1407	2.5%
Allied Commands: NATO/NORAD	162	.28%
Strategic Apex Total	3168	5.5%

Table 3-3. Navy Officer Billets in the Strategic Apex (Source: Bureau of Personnel Body and Billet File, September 1997)

wings. In "The Joint Bureaucracy," the first part of the middle line is the component commanders. The component commanders direct the numbered fleets and then the numbered fleets direct the task forces. An important thing to note about the task forces is that they do not typically have standing staffs. The staffs tend to be on an ad hoc basis depending on the needs of the theater CINC. These ad hoc staffs are usually manned by the carrier group staffs (CARGRU), the destroyer squadron staffs, and the submarine group staffs. For the purposes of this analysis, I am only counting the CARGRU staffs in the Joint Bureaucracy due to the fact that both the DESRON staffs and the submarine group staffs are already counted in "The Navy Bureaucracy". The number of naval officers employed in the middle line of the two bureaucracies are displayed in Table 3-4.

Naval Officer Billets in the Middle Line		
Organization	Navy Officer Billets	% of Total Navy Officers Billets
Pure Navy Bureaucracy		
CINCLANTFLT/CINCPACFLT	434	.76%
6 Type Commands	672	1.2%
33 Groups/ Functional Air Wings	766	1.3%
62 Ship Squadrons/ Air Type Wings	820	1.4%
Pure Naval Bureaucracy Sub-Total	2692	4.7%
The Joint Bureaucracy		
Component Commands	900	1.6%
Numbered Fleets	277	.48%
Task Forces (CARGRU only)	206	.36%
The Joint Bureaucracy Sub-Total	1383	2.4%
Middle Line Total (Only counts LANTFLT and PACFLT once)	3641	6.4%

Table 3-4. Navy Officer Billets in the Middle Line (Source: Bureau of Personnel Body and Billet File, September 1997)

4. The Operating Core

The operating core for the Navy is the ships, submarines, aircraft squadrons, and special operations forces that actually do the work of the Navy. The major operating units of the Navy are the carrier battle group, the amphibious ready group, the fast attack submarine, the ballistic missile submarine, and the naval special warfare team. The carrier battle group and the amphibious ready group can be divided further into individual ships and aircraft squadrons. Each of these units has its own administrative and operational command structure. The top of both command structures is the unit commanding officer. In the administrative chain of command the commanding officer is followed by the executive officer and then by the department heads and the division officers. Each division officers is in charge of a division of enlisted personnel. He is typically leads his division with the aid and guidance of a leading chief

petty officer or a leading petty officer. See Tables 3-5, 3-6, 3-7 and 3-8 for sample officer administrative billet structures.

TICONDEROGA CLASS CRUISER BILLET STRUCTURE: CG-68 ANZIO

BILLET	GRADE	DESIG	SUBSPECIALTY CODE
COMMANDING OFFICER	O-6	1110	0044H
EXECUTIVE OFFICER	O-5	1110	
DEPARTMENT HEADS			
OPERATIONS OFFICER	O-4	1110	0046S
SHIP ENGINEER	O-4	1110	0054H
COMBAT SYSTEM OFFICER	O-4	1110	0066H
SUPPLY OFFICER	O-4	3100	1300H
DIVISION OFFICERS			
FIRE CONTROL SAM	O-3	1110	
FIRE CONTROL OFFICER	O-3	1110	
NTDS-CIC	O-3	1110	
SHIP NAVIGATOR	O-3	1110	
DAMAGE CONTROL	O-3	1110	
CHAPLAIN	O-3	4100	
SHIP ELECTRONIC MATERIAL	O-3	6180	
ASW OFFICER	O-2	1110	
FIRST LT AFLOAT	O-2	1110	
STRIKE WARFARE	O-2	1110	
MAIN PROPULSION ASSISTANT	O-2	1110	
STORES/FOOD SERVICE	O-2	3100	
FIRE CONTROL SAM	O-2	6160	
DIVISION WEAPONS ASW	O-1	1160	
ELECTRICAL DIVISION OFFICER	O-1	1160	
AUXILIARY MACHINERY	O-1	1160	
COMMUNICATIONS OFFICER	O-1	1160	0089S
ADP SYSTEMS	O-1	1160	0091S
DISBURSING	O-1	3100	
NTDS-CIC//OI DIV	O-1	6120	
SHIP ELECTRONIC WARFARE	W-3	7440	

Table 3-5. Sample Surface Ship Officer Billet Structure (Source: Bureau of Personnel Body and Billet File, September 1997)

LOS ANGELES CLASS FAST ATTACK SUBMARINE BILLET STRUCTURE:SSN 754 TOPEKA

BILLET	GRADE	DESIG	SUBSPECIALTY CODE
COMMANDING OFFICER	O-5	1120	0053F
EXECUTIVE OFFICER	O-4	1120	0053G
DEPARTMENT HEADS			
NAVIGATION/OPERATIONS	O-4	1120	
SHIP ENGINEER NUCLEAR	O-4	1120	0053G
COMBAT SYSTEMS OFFICER	O-3	1120	
SUPPLY OFFICER	O-3	3100	
DIVISION OFFICERS			
MAIN PROPULSION ASSISTANT	O-3	1120	
DAMAGE CONTROL ASSISTANT	O-3	1120	
ELECTRICAL ASSISTANT	O-2	1120	
ASSISTANT WEAPONS	O-2	1120	
COMMUNICATIONS OFFICER	O-2	1120	0089S
FIRSTLT AFLOAT	O-1	1170	
RADIOLOGICAL CONTROL	O-1	1170	
SHIP REACTOR CONTROL	O-1	1170	

Table 3-6. Sample Submarine Officer Billet Structure (Source: Bureau of Personnel Body and Billet File, September 1997)

FIGHTER ATTACK SQUADRON BILLET STRUCTURE: VFA-25

BILLET	GRADE	DESIG	SUBSPECIALTY CODE
COMMANDING OFFICER	O-5	1311	
EXECUTIVE OFFICER	O-5	1311	
DEPARTMENT HEADS			
4 DEPARTMENT HEADS	O-4	1311	
DIVISION OFFICERS			
A/C OMNT GEN	O-4	1520	
A/C OMNT MTL	O-3	6330	
A/C OMNT AV/WP	O-2	1520	
ADMINISTRATIVE OFFICER	O-2	6410	
TACTICAL INTELLIGENCE	O-1	1630	
A/C OMNT AV/WP	O-1	6360	
A/C OMNT/MTL	W-3	7340	
A/C MTLCTL & AL	W-3	7340	
4 AVIATOR	O-3	1311	
7 AVIATOR	O-2	1311	

Table 3-7. Sample Aircraft Squadron Officer Billet Structure (Source: Bureau of Personnel Body and Billet File, September 1997)

SEAL TEAMS BILLET STRUCTURE: SEAL TEAM 3

BILLET	GRADE	DESIG	SUBSPECIALTY CODE
COMMANDING OFFICER	O-5	1130	
EXECUTIVE OFFICER	O-4	1130	
DEPARTMENT HEADS			
STAFF OPERATIONS	O-4	1130	
TRAINING/MOB&SEL/SEAL	O-3	1130	
STAFF PLANNING	O-3	1130	0029P
INTELLIGENCE	O-3	1630	
SUPPLY	O-3	3100	
DIVISION OFFICERS			
TRAINING-SEAL	O-3	6150	
8 * SEAL PLTN CMDR	O-3	1130	
8 * SEAL-ASST PLTN CMDR	O-2	1130	
CMBT SYS-SEAL	W-4	7150	
TRAINING-SEAL	W-4	7150	
SEAL-AIR OPS OFF	W-3	7150	
TRAINING-SEAL	W-3	7150	
GUN/ORD-SEAL	W-3	7150	

Table 3-8. Sample Seal Team Officer Billet Structure (Source: Bureau of Personnel Body and Billet File, September 1997)

Navy Officers Billets in the Operating Core

Navy	Navy Officer	% of Total
Type of Operating Unit	Billets	Officers Billets
AIRCRAFT CARRIERS	1,847	3.2%
COMBATANTS	2,730	4.8%
AMPHIBIOUS SHIPS	1,479	2.6%
COMMAND SHIPS	127	.22%
MINE COUNTERMEASURE SHIPS	195	.34%
BROWN WATER BOATS	121	.21%
AUXILIARY SHIPS	595	.10%
MILITARY SEALIFT SHIPS	69	.12%
FAST ATTACK SUBMARINES	1,074	1.9%

Table 3-9. Navy Officers Billets in the Operating Core (Source: Bureau of Personnel Body and Billet File, September 1997)

Navy Officer Billets in the Operating Core (CONT)		
Type of Operating Unit	Navy Officer Billets	% of Total Navy Officers Billets
BALLISTIC MISSILE SUBMARINES	519	.90%
SEAL TEAMS/ SDVT TEAMS	277	.48%
SPECIAL WARFARE UNITS	311	.54%
FIGHTER/ ATTACK SQUADRONS	725	1.3%
FIGHTER SQUADRONS	539	.94%
ELECTRONIC ATTACK SQUADRONS	446	.78%
AIRBORNE EARLY WARNING SQUADRONS	372	.65%
SEA CONTROL SQUADRONS	453	.79%
PATROL SQUADRONS	1,028	1.8%
ELECTRONIC/ COMMUNICATIONS SQUADRONS	437	.76%
VR SQUADRONS	138	.24%
VRC SQUADRONS	107	.19%
VC SQUADRONS	73	.13%
VFC SQUADRONS	29	.05%
VR SQUADRONS	18	.03%
HS SQUADRONS	274	.48%
HSL SQUADRON	597	1.0%
HM SQUADRON	68	.12%
HC SQUADRON	418	.73%
MISC AVIATION COMMANDS	76	.13%
TOTAL OPERATING CORE	15,169	26.5%

Table 3-9. Navy Officer Billets in the Operating Core (CONT) (Source: Bureau of Personnel Body and Billet File, September 1997)

In addition to the administrative command structure, each operating unit has an operational command structure in the form of the watch organization. On a F/A-18, this can be as simple as a pilot, but as the platform gets bigger the watch organization gets more complex. On a submarine, the officer of the deck is in charge of the operational structure of

the ship under the supervision of the commanding officer. Typically, there are at least two officers assisting him, a junior officer of the deck and a nuclear engineering officer of the watch. On Ticonderoga Class cruisers the watch organization is even more complex and can consist of up to five or six officers at a time. An officer's time is typically split between his administrative duties and his watch responsibilities. See Table 3-9 for the number of officer billets in the operating core.

5. The Technostructure

The technostructure serves the organization by affecting the work of others. They design the work and train the people who do the work, but do not do the work themselves. In "The Navy Bureaucracy", the systems commands and the training and education commands serve as the technostructure. They dominate the organization through standardization in the form of tactics and procedures. This is the most technical part of the Navy as it deals with weapon development and employment. In "The Joint Bureaucracy", the technostructure is by and large the entire Pure Navy Bureaucracy. The number of officers employed by the technostructure is displayed in Table 3-10.

Navy Officer Billets in the Technostructure		
Type of Operating Unit	Navy Officer Billets	% of Total Navy Officers Billets
SYSTEMS COMMANDS/ TACTICS AND WEAPONS DEVELOPMENT	2,913	5.1%
OFFICER EDUCATION	702	1.2%
TRAINING	2,535	4.4%
STUDENTS	8,400	14.7%
TOTAL TECHNOSTRUCTURE (PURE NAVAL BUCREAUCY)	14,550	25.4%

Table 3-10. Navy Officer Billets in the Technostructure (Source: Bureau of Personnel Body and Billet File, September 1997)

6. The Support Staff

As previously discusses, the support staff are specialists that exist to provide support that is outside the operating work flow. This work includes, public affairs, intelligence gathering, personnel/ administrative management, recruiting, shore based C4ISR, reserve administration, and the list goes on. Some officers support the core work of the Navy by serving in Non-Department of Defense Agencies, Department of Defense Agencies, and Department of the Navy Agencies. The number of naval officers employed in the support structure is displayed in Table 3-11.

Navy Officer Billets in the Support Staff		
Type of Operating Unit	Navy Officer Billets	% of Total Navy Officers Billets
NON-DOD GOVERNMENT AGENCIES	67	.12%
DOD AGENCIES	1,033	1.8%
DON AGENCIES	101	.18%
PUBLIC AFFAIRS	67	.17%
LEGAL SERVICES	400	.70%
PERSONNEL MANAGEMENT/ ADMIN	738	1.3%
RECRUITING	790	1.4%
INTELLIGENCE	574	1.0%
SHORE BASED C4ISR COMMANDS	393	.69%
OCEANOGRAPHY/ METEOROLOGICAL COMMANDS	253	.44%
RESERVE ADMINISTRATION	308	.54%
POLITICAL/ FOREIGN AFFAIRS	421	.73%
DEPOT LEVEL MAINTENANCE	760	1.3%
BASE SUPPORT (INCLUDES CONSTRUCTION BATTALIONS)	2973	5.2%

Table 3-11. Navy Officer Billets in the Support Staff (Source: Bureau of Personnel Body and Billet File, September 1997)

Navy Officer Billets in the Support Staff (CONT)		
Type of Operating Unit	Navy Officer Billets	% of Total Navy Officers Billets
SHORE BASED LOGISTICS COMMANDS	897	1.6%
MEDICAL	10,400	18.1%
OTHER MILITARY SERVICE LIAISONS	161	.28%
MISCELLANEOUS	450	.79%
SUPPORT STAFF TOTAL	20,786	36.3%

Table 3-11. Navy Officer Billets in the Support Staff (CONT) (Source: Bureau of Personnel Body and Billet File, September 1997)

IV. THE NAVAL OFFICER OF TODAY

A. OVERVIEW

In the Systems Model, people or in this case naval officers refers to who the people are and what skills, knowledge, abilities, and attributes they have. This chapter will describe who naval officers are using rank and demographic data. It will describe occupational differentiation between officer communities, it will describe the general skills, knowledge, and abilities of officers, and in addition it will describe the traditional naval officers attributes.

B. RANK AND DEMOGRAPHICS: WHO ARE NAVAL OFFICERS

1. Rank

Officers Rank Distribution			
Rank		Number	Percentage
O-10	Admiral	9	.02%
O-9	Vice Admiral	26	.05%
O-8	Rear Admiral (Upper Half)	96	.2%
O-7	Rear Admiral (Lower Half)	139	.3%
O-6	Captain	3,270	5.8%
O-5	Commander	7,059	12.6%
O-4	Lieutenant Commander	10,702	19.1%
O-3	Lieutenant	19,544	34.8%
O-2	Lieutenant Junior Grade	5,827	10.4%
O-1	Ensign	7,375	13.1%
W-1 -W-5	Chief Warrant Officer	2,079	3.7%

Table 4-1. Officers Rank Distribution (Source: Navy Bureau of Personnel Website, 18 April 1998 and Naval Institute Proceedings, May 1998)⁴⁸

⁴⁸ The sum of the percentages do not equal 100% due to rounding.

The most obvious means of grouping naval officers is by rank. Rank under the current design is a measure of longevity. The current structure has 10 commissioned officer ranks ensign through admiral and 5 chief warrant officer ranks. The rank distribution is weighted heavily toward the rank of lieutenant with 34.8%. See Table 4-1 for rank distribution.

2. Composition by Sex and Racial/Ethnic Group

As shown in Table 4-2, there are 55,576 naval officers. These officers are predominantly white males at 74.3%. White females are the second largest group with 11.3%. The proportion of all officers who are African American is 6.3%, and the proportion who are Hispanic is 3.9%.

Officer Demographic Data (W-1 to O-10)			
	Male	Female	Total
White	74.3%	11.3%	85.6%
Native American	0.4%	0.1%	0.5%
Asian American	2.7%	0.7%	3.4%
African American	4.9%	1.4%	6.3%
Hispanic	3.3%	0.6%	3.9%
Other/Unknown	0.4%	0.1%	0.4%
Total	86.0%	14.0%	55,576

Table 4-2. Navy Officer Demographic Data (Source: Defense Manpower Data Center, June 1998)

Table 4-3 provides a more detailed view of the composition of the officers corps by sex and racial/ethnic group by showing the distribution by paygrade within the Navy. Within the Navy, the highest concentration of African Americans is in the lower paygrades. About fifteen percent of warrant officers and 7.2% of ensigns through lieutenants are African American whereas African Americans are only 3.2% of the flag officers and are only 4.1% of Lieutenant Commanders through Captains. Women are more heavily concentrated in the middle and lower ranks. In the junior ranks, 15% of ensigns through lieutenants and 13.5% of lieutenant commanders through captain are women, while only 3.7% of flag officers and 5.1% of warrant

Pay Grade and Racial/Ethnic Group Distribution	Number			Percent		
	Male	Female	Total	Male	Female	Total
O-7 through O-10						
White	200	7	207	92.2%	3.2%	95.4%
Native American	1	0	1	0.5%	0.0%	0.5%
Asian American	0	0	0	0.0%	0.0%	0.0%
African American	6	1	7	2.8%	0.5%	3.2%
Hispanic	2	0	2	0.9%	0.0%	0.9%
Other/Unknown	0	0	0	0.0%	0.0%	0.0%
Total	209	8	217	96.3%	3.7%	100.0%
O-4 through O-6						
White	16668	2395	19063	79.1%	11.4%	90.5%
Native American	72	18	90	0.3%	0.1%	0.4%
Asian American	362	86	448	1.7%	0.4%	2.1%
African American	627	242	869	3.0%	1.1%	4.1%
Hispanic	465	82	547	2.2%	0.4%	2.6%
Other/Unknown	36	17	53	0.2%	0.1%	0.3%
Total	18230	2840	21070	86.5%	13.5%	100.0%
O-1 through O-3						
White	23019	3799	26818	71.0%	11.7%	82.7%
Native American	151	18	169	0.5%	0.1%	0.5%
Asian American	1093	281	1374	3.4%	0.9%	4.2%
African American	1820	520	2340	5.6%	1.6%	7.2%
Hispanic	1354	226	1580	4.2%	0.7%	4.9%
Other/Unknown	129	15	144	0.4%	0.0%	0.4%
Total	27566	4859	32425	85.0%	15.0%	100.0%
W-1 through W-5						
White	1391	72	1463	74.6%	3.9%	78.5%
Native American	8	0	8	0.4%	0.0%	0.4%
Asian American	50	1	51	2.7%	0.1%	2.7%
African American	257	18	275	13.8%	1.0%	14.8%
Hispanic	26	2	28	1.4%	0.1%	1.5%
Other/Unknown	37	2	39	2.0%	0.1%	2.1%
Total	1769	95	1864	94.9%	5.1%	100.0%

Table 4-3. Number and Percentage Distribution of Active Duty Naval Officers, by Paygrade, Racial/Ethnic Group, and Sex, June 1998 (Source: Defense Manpower Data Center, June 1998)

officers are women. Hispanics are more heavily concentrated in the lower ranks with 4.9% of ensigns through lieutenant being Hispanic and only 2.6% of lieutenant commanders through captain and .9% of flag officers being Hispanic. Asian Americans like women are more heavily concentrated in the middle and lower ranks with 4.2% of ensigns through lieutenant and 2.1% of lieutenant commander through captain being Asian American.

C. OCCUPATIONAL DIFFERENTIATION: SPECIALISTS VERSUS GENERALISTS

Officers are divided into four groups: unrestricted line officers (URL), restricted line (RL) officers, staff officers, and limited duty officers/warrant officers. See Table 4-4 for officer grouping distribution. The URL grouping is 47.0% of the officer corps and consists of officers that are capable of being assigned directly to warfighting billets. These officers are typically referred to as the generalists, but this is somewhat misleading. These officers are specialized by platform and to a large degree spend most of their career within their platform specialty until they reach flag rank. A better categorization of this group would be specialist in warfare. The

Officer Grouping Distribution	Number	Percentage
Unrestricted Line	26,257	47.0%
Restricted Line	6,061	10.9%
Staff	17,559	31.4%
Limited Duty/Warrant	5,961	7.7%

Table 4-4. Officer Grouping Distribution (Source : The Naval Bureau of Personnel Website, May 1997.)

RL grouping is 10.9% of the officer corps and consists of specialists who due to extensive training and education are managed separately from unrestricted line officers. The staff grouping is 31.4% of the officer corps and consists of specialists who have direct civilian equivalents e.g. doctor, lawyer, civil engineer. The fourth grouping of limited duty and warrant

officers is 10.7% of the officer corps and consists of highly technical specialist who perform operational support for the warfighting portion of the Navy. Officers in this grouping were typically top performing senior enlisted who due to their technical knowledge and superior performance were accessed into the officer ranks.

1. Unrestricted Line Officers: Warfare Specialists

The unrestricted line consists of platform specialists in surface warfare, submarine warfare, special warfare, special operations, and aviation. Aviation specialists are divided into pilots and naval flight officers. The distribution of the URL between the platform specialties is shown in Table 4-5. Pilots make up the largest portion of the URL. They are followed closely by surface warfare specialists and then by naval flight officers and submarine warfare specialists. The smallest groups in the URL are the special warfare community and the special operations community. The special warfare community or SEALs specialize in unconventional warfare, counter-insurgency, coastal and riverine interdiction, and tactical intelligence collection. The special operations community specializes in ordnance management and disposal, mine warfare, and diving and salvage.

Unrestricted Line Specialties			
Designator	Function	Number of Officers	Percentage of Officer Population
111X and 116X	Surface Warfare	8,184	14.7%
112X and 117X	Submarine Warfare	3,705	6.6%
113X, 118X, 114X and 119X	Special Warfare/ Special Operations	856	1.5%
131X and 139X	Pilot	9,090	16.3%
132X and 137X	Naval Flight Officer	4,422	7.9%
Total Unrestricted Line		26,257	47.0%

Table 4-5. Unrestricted Line Specialties (Source: Bureau of Personnel Website, May 1997)

2. Restricted Line Officers

The restricted line grouping consists of specialists that support both operational and institutional parts of the Navy. This grouping includes engineering and maintenance specialists,

intelligence and cryptology officers, public affairs and fleet support officers, and meteorological/oceanographic (METOC) specialists. These officers are separated due to their extensive training and education and serve almost exclusively in billets in their specialty. The distribution within the restricted line grouping is listed in Table 4-6. The largest specialty within the restricted line group is the fleet support specialty followed closely by the naval intelligence

Restricted Line Specialties		
Specialties	Number	Percentage of Officer Population
14XX ENGINEERING DUTY OFFICER	899	1.6%
151X AEROSPACE ENGINEERING DUTY OFFICER	362	.7%
152X AEROSPEACE MAITENANCE DUTY OFFICER	463	.8%
161X CRYPTOLOGIC OFFICER	719	1.3%
163X NAVAL INTELLIGENCE OFFICER	1,188	2.1%
165X PUBLIC AFFAIRS OFFICER	194	.4%
170X FLEET SUPPORT OFFICER	1,820	3.3%
18XX METEOROLOGICAL/ OCEANOGRAPHIC OFFICERS	416	.8%
TOTAL RL	6,061	10.9%

Table 4-6. Restricted Line Specialties (Source: Bureau of Personnel Website, May 1997.)

specialty and the engineering duty officer specialty. The smallest specialty is the public affairs specialty with only 194 officers.

3. Staff Officers

Staff officers represent the professional support branch of the Navy. Staff officers specialize in occupations that have direct civilian equivalents and often require advanced civilian education. Specialties within the staff corps include doctors, dentists, medical service administrators, lawyers, nurses, supply officers, chaplains, and civil engineers. The distribution

of officers within this grouping is listed in Table 4-7. The largest community within the staff grouping is the medical community. The supply community acting as the Navy's business managers are the second largest with the medical service corps closely behind. The smallest community in the staff grouping are the lawyers in the Judge Advocate General Corps.

Staff Corps Specialties		
Designator	Number	Percentage of Officer Corps
19XX PROSPECTIVE STAFF CORPS	198	.4%
210X MEDICAL	4,043	7.2%
220X DENTAL	1,293	2.3%
230X MEDICAL SERVICE CORPS	2,628	4.7%
250X JUDGE ADVOCATE CORPS	861	1.5%
290X NURSE	3,216	5.8%
310X SUPPLY	3,037	5.4%
410X CHAPLAIN	940	1.7%
510X CIVIL ENGINEERING CORPS	1,343	2.4%
TOTAL STAFF CORPS	17,559	31.4%

Table 4-7. Staff Corps Specialties (Source: The Bureau of Personnel Website, May 1997)

4. Limited Duty Officers and Chief Warrant Officers

The limited duty officer and warrant officer grouping consists of highly technical specialists who perform operational support for the warfighting portion of the Navy. Officers in this grouping were typically top performing senior enlisted who due to their technical knowledge and superior performance were accessed into the officer ranks. Table 4-8 lists the specialties of the limited duty officer and warrant officer grouping.

Limited Duty Officer/ Chief Warrant Officer Specialties			
Limited Duty Officers		Chief Warrant Officer	
Number of Officers	3,941	Number of Officers	2,020
% of Officer Corps	7.1%	% of Officer Corps	3.6%
<u>Designators</u>		<u>Designators</u>	
611X SURFACE DECK		711X SURFACE BOSUN	
612X SURFACE OPERATIONS		712X SURFACE OPERATIONS	
613X SURFACE ENGINEERING/REPAIR		713X SURFACE ENGINEERING	
616X SURFACE ORDNANCE		714X SURFACE REPAIR	
618X SURFACE ELECTRONICS		715X SPECIAL WARFARE TECHNICIAN	
619X SURFACE COMMUNICATIONS		716X SURFACE ORDNANCE	
621X SUBMARINE DECK		718X SURFACE ELECTRONICS	
623X SUBMARINE ENGINEER/REPAIR		719X SURFACE COMMUNICATIONS	
626X SUBMARINE ORDNANCE		720X SUBMARINE DIVER	
628X SUBMARINE ELECTRONICS		721X SUBMARINE BOSUN	
629X SUBMARINE COMMUNICATIONS		723X SUBMARINE ENGINEERING	
631X AVIATION DECK		724X SUBMARINE REPAIR	
632X AVIATION OPERATIONS		726X SUBMARINE ORDNANCE	
633X AVIATION MAINTENANCE		728X SUBMARINE ELECTRONICS	
636X AVIATION ORDNANCE		731X AVIATION BOSUN	
638X AVIATION ELECTRONICS		732X AVIATION OPERATIONS	
639X AIR TRAFFIC CONTROL		734X AVIATION MAINTENANCE	
640X NUCLEAR POWER		736X AVIATION ORDNANCE	
641X ADMINISTRATION		738X AVIATION ELECTRONICS	
642X DATA PROCESSING		740X NUCLEAR POWER	
647X PHOTOGRAPHY		741X SHIPS CLERK	
644X CRYPTOLOGY		742X DATA PROCESSING	
645X INTELLIGENCE		744X CRYPTOLOGY	
646X METEOROLOGY/ OCEANOGRAPHY		745X INTELLIGENCE	
643X BANDMASTER		747X PHOTOGRAPHER	
648X EXPLOSIVE ORDNANCE DISPOSAL		748X EXPLOSIVE ORDNANCE DISPOSAL	
649X SECURITY		749X SECURITY	
651X SUPPLY		751X SUPPLY	
653X CIVIL ENGINEERING		752X FOOD SERVICE	
655X LAW		753X CIVIL ENGINEERING	

Table 4-8. Limited Duty Officer/ Chief Warrant Officer Specialties (Source: Bureau of Personnel Website, May 1997 and The Naval Officer Career Planning Guidebook, 1990.)

5. Trends in Officer Differentiation

In the past 20 years, the Navy has seen a decline in the relative URL/warfare specialist representation within the officer corps by over 10% as shown by Figure 4-1. The relative representation of the RL and staff groupings within the Navy have consequently increased. This shift from the URL grouping to the RL and Staff grouping is the result of two factors. The first, is the creation of the Fleet Support community as a part of the restricted line. In the past, these officers were categorized as general unrestricted line officers and were subsequently a part of the URL grouping. The second is that the number of pilots has been on a steady decline since the 1970s. This trend was exacerbated with the military wide drawdown in the early 1990s.

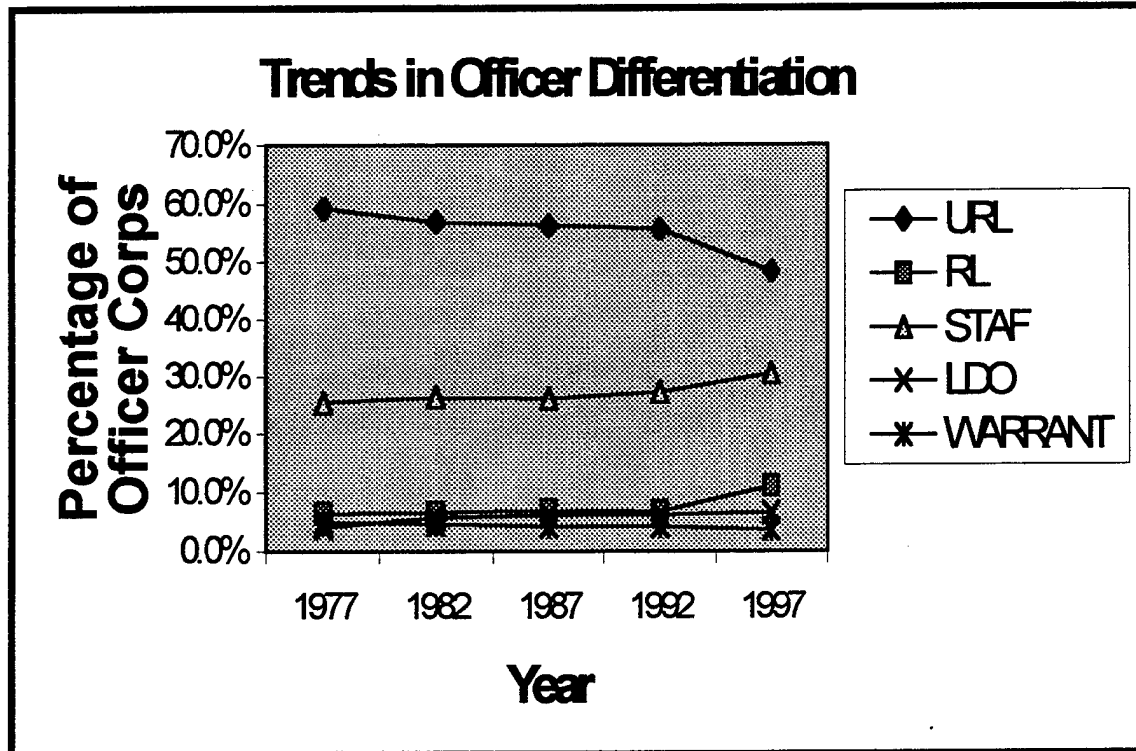


Figure 4-1. Trends in Officer Differentiation (Source: Naval Bureau of Personnel OPIS Database, 1997)

D. SKILLS, KNOWLEDGE, ABILITIES OF THE NAVAL OFFICER OF TODAY

The senior level division officer/ department head level naval officer of today generally has three clusters of skills, knowledge, and abilities (SKA): a traditional platform centric cluster, a leadership cluster, and a management cluster. In this context, a cluster of SKAs refers those skills, knowledge, and abilities that are required to complete a certain aspect of a job. While, skills refer to the capability to perform job operations with ease and precision. Knowledge refers to the body of information necessary to make adequate job performance possible. Ability refers to the cognitive capabilities necessary to perform a job function.⁴⁹ The SKA clusters are summarized in Table 4-9.

SKA Clusters of the Naval Officer of Today

1. Traditional platform centric cluster

- Ship and aircraft handling and maneuver.
- Knowledge of and the ability to apply technology on the individual platform level.
- Knowledge of and the ability to perform single unit operations and tactics.

2. Charismatic Leadership Cluster

- Skills, knowledge, and ability to through sheer force of will convinces his subordinates to do what they would not normally do and do this without question.
- Knowledge of human motivation.
- Skills and ability to give clear concise orders.
- Ability to delegate.
- Skills and ability to use the chain of command to accomplish assigned tasks.

3. Management Cluster

- Skills and abilities in the management of tasks and technology.
- Knowledge and ability in aspects of human resource management including evaluation/counseling, training, and in the enlisted promotion process.
- Skills and abilities to manage diversity

Table 4-9. SKA Clusters of the Naval Officer of Today (Source: Author)

1. The Traditional Platform Centric Cluster

This SKA cluster refers to the skills, knowledge, and abilities that relate directly to an officers specialty. For most URL officers, this includes ship and aircraft handling, a knowledge

⁴⁹ Paul M. Muchinsky, *Psychology Applied to Work*, (Brooks/Cole Publishing: Pacific Grove, CA, 1997), p. 182.

of and the ability to apply technology on the platform level, and the knowledge and ability to perform single unit operations and tactics. For the specialists, it includes the requisite knowledge of their specialty e.g. METOC officers must be well versed in meteorology and oceanography.

2. The Leadership Cluster

"During the engagement off Samar Island at the Battle of Leyte Gulf in October 1944, a small task force, Taffy 3, was destined to enter the halls of combat glory by defending the landing force in some of the heaviest fighting ever seen at sea. Admiral Clifton A. F. "Ziggy" Sprague's small escort carriers, their embarked air groups, and sailors on destroyers and destroyer escorts fought 'against overwhelming odds from which survival could not be expected.'

When Commander Ernest E. Evans, USN, commanding officer of the destroyer *USS Johnston* (DD-557), saw the pagoda masts of enemy battleships and cruisers on the horizon off Samar Island, he laid a smoke screen to protect the escort carriers and steered his small and outclassed ship directly toward the enemy. After closing within firing range, the *Johnston* fired all ten torpedo tubes, striking the enemy cruiser *Kumano* (which later sank). The *Johnston* then took evasive action and ducked into a rain squall.

After receiving hits on the bridge and elsewhere, the *Johnston* received a general order for all destroyers to make torpedo attacks. *Johnston* rejoined the fray, making dummy torpedo attack runs and fighting on with her modest complement of guns-- attempting to draw enemy fire and force the enemy to take evasive action. The *Johnston* took on the 30,000 ton battleship *Kongo*, scoring fifteen hits before ducking into her own smoke screen in safety. During the enemy counter-attack, Commander Evans lost two fingers and, in the force of a blast, all the clothing above his waist was blown off.

When an enemy cruiser engaged one of the escort carriers, Evans closed the cruiser and scored four hits with his guns. As a squadron of four Japanese destroyers and a light cruiser maneuvered to box in the escort carriers of the American defending force, Commander Evans seized the initiative by attacking the whole squadron. *Johnston's* furious close-in gunfire so startled the enemy that their torpedoes were launched prematurely, causing no damage to the escort carriers. The enemy force singled out *Johnston* for their vengeance. After a series of mortal blows, *Johnston* was sunk. Commander Evans was

never recovered...Commander Evans was awarded the Medal of Honor," [posthumously].⁵⁰

Commander Evans in the Battle of Leyte Gulf personifies the traditional Navy leadership model. This model views the leader as a charismatic and heroic individual who through sheer force of will convinces his subordinates to do what they would not normally do and do this without question. General W. H. Rice, USMC sums up leadership in this model as "know yourself, know your troops, and know your job!" The leader here is expected to know what leadership style best fits his or her personality and what leadership style best fits his or her situation. The leader is expected to know his troops, know the names of their spouses and children, and know what motivates them. The leader has to be an expert in his/her area. The leader must be able to give clear and concise orders. To sum it up, the basis for leadership in this model is personal example, moral responsibility, good management, tact, dependability, and a sense of humor.⁵¹

Two important aspects of this leadership model are accountability and the chain of command. Both of these aspects are derived from the heroic view of leadership. If the leader is truly the heroic individual and is to be followed without question, then that leader must make the right decisions. This is enforced by requiring the officer to be responsible for the actions of his unit regardless of intent. The classic example of accountability is the ship captain whose ship runs aground while he is asleep. He is accountable for the grounding even though he was not on the bridge. At least in theory, he is at fault for creating a situation where an accident like this could happen.

Since individuals can only successfully manage a certain span of control, the concept of the chain of command was developed to ensure that officer accountability was maintained. Consequently, a hierarchical command structure in the shape of a pyramid was formed so that

⁵⁰ James Tritten, *Navy Combat Leadership for Tomorrow: Where Will We Get Such Men and Women?*, (Naval Doctrine Command: Norfolk, VA, July 1995), p. 1.

⁵¹ Karel Montor, et al., *Naval Leadership: Voices of Experience*, (Naval Institute Press, Annapolis, MD, 1987), pp. 3, 7-16.

each successive layer could hold the other accountable through delegation. This ensures that one individual is not overwhelmed by information and the need for action.

"In simple terms, the chain of command is the pyramid structure of communications, authority, and responsibilities which allows every individual in an organization to know what is going on with those below and what is expected by those above."⁵²

It acts as both a conduit for information and a filter of information deemed extraneous. This is a crucial concept for accountability for this is how officers acquire the information necessary to make the right decisions and can thus be held accountable. The chain of command is at least in theory to be bypassed only when "doing so is necessary for the national good."⁵³

3. The Management Cluster

In the context of the Systems Model, leadership refers to the setting of the system's direction whereas management refers to mastery of the system's design factors.⁵⁴ Consequently, management is a necessary component part of being a leader, but not sufficient for success. There are several areas of management: financial management, technology management, human resource management, etc. Today's naval officers in general are required to have SKAs in the management of tasks and technology and in some areas of human resource management e.g. personnel evaluation/counseling, training, promotion. Organization design/Structure, financial management, and information management are required in some areas by some naval officers, but as a whole, naval officers are not educated in these areas. In addition, naval officers are required to have skills and abilities in managing diversity in the workplace as minority and female populations within the Navy increase.

E. TRADITIONAL NAVAL OFFICER ATTRIBUTES

Attributes refer to the baseline characteristics of that all naval officers need to be successful. Montor et al. list the traditional attributes of the naval officers as the following:

⁵² Ibid. p. 112.

⁵³ Ibid. p. 113.

⁵⁴ Nancy Roberts, Interview by author, Naval Postgraduate School, 20 August 1998.

- Officers must be **loyal**. Loyalty in this context has three aspects. First, an officer must be loyal to his country. Second, an officer must be loyal to his or her superiors through serving them efficiently and well. Third, an officer must be loyal to his or her subordinates whereby the leader looks out for the legitimate interests of his or her subordinates.
- Officers must show **courage, physical and moral**.
- Officers must have **honor** and be **honest** and **truthful**. They must have an acute sense of right and wrong and adhere strictly to what they believe is right. They must refuse to lie, defraud, steal, or deceive under any circumstances.
- Officers must have **initiative** the **ability to plan ahead**, and **imagination**. They need to do what ought to be done without being told. They must be able to look toward the future and see what must be done and when necessary devise new methods to accomplish tasks.
- Officers must be **decisive** when necessary.
- Officers must be **enthusiastic** for through enthusiasm leaders can build enthusiastic supporters.
- Officers must have **faith**. In this context, faith refers confidence in oneself, confidence in mankind, and confidence in one's cause. As such, faith acts like enthusiasm in that it is contagious.
- Officers must have **religious faith**. Montor et al state that "the leader who sincerely believes and has faith in a creator, regardless of the particular denomination to which he belongs, is endowed with a fortitude and a serenity which will sustain him during periods of stress and misfortune."
- Officers must be **reliable** and **prompt**.
- Officers should have a **sense of humor** in order to relieve the tension that is endemic with combat.
- Officers should be **modest** and have **tact**.

- Officers should have **self-confidence** and not be afraid to undertake the difficult assignment.
- Officers are required to have **common sense** and **good judgement** thus enabling officers to make intelligent choices or decisions.
- Officers must be of **good health**, have **energy**, and be **optimistic**.
- Officers should be **professional** and have **self-control**.⁵⁵

⁵⁵ Karel Montor et al. ed., *Fundamentals of Naval Leadership*, (Naval Institute Press: Annapolis, MD, 1984), pp. 107-127.

V. THE NAVY'S OFFICER CAREER MANAGEMENT SYSTEM

A. OVERVIEW

Chapter IV discussed the naval officer of today. This chapter discusses how the Navy manages these officers. The Navy's officer personnel management system as introduced in chapter II has seven primary personnel functions: accession, development, promotion, assignment, compensation, personnel evaluation, and separation/transition. The Navy manages these functions primarily through the centralized bureaucracy of the Chief of Naval Operations Staff (the N1 and N7 organizations), the Navy Personnel Command now located in Millington Tennessee, the Chief of Naval Education and Training (CNET) and various other naval education and training commands, and the United States Naval Academy in Annapolis, Maryland.

B. ACCESSING

The accession process for officers includes the recruiting of officer candidates, the screening out of "undesirable" candidates, and the indoctrination of officer candidates into the officer corps. The Navy has four categories of programs to perform this function:

1. programs for high school and college students,
2. programs for college graduates,
3. programs for junior enlisted who demonstrate sufficient aptitude to be officers,⁵⁶
and
4. programs for professionals and senior enlisted personnel.⁵⁷

This section will concentrate on the attributes of the first two program categories, those targeted at high school students, college students, and college graduates namely the United States Naval Academy (USNA), the Naval Reserve Officer Training Corps (NROTC)

⁵⁶ Programs for junior enlisted personnel include the Enlisted Commissioning Program (ECP) and the Broadened Opportunity for Officer Selection Training Program (BOOST).

Scholarship and Non-Scholarship Programs, and the Officer Candidate School Program (OCS). Programs targeted at junior enlisted personnel are similar to the first two program categories. The major difference being the recruiting target population is junior enlisted personnel instead of civilians. In fact, most of these programs require the same schooling as the first two program categories.⁵⁸ The fourth category is targeted at professionals and senior enlisted personnel for entry into the professional support communities.⁵⁹ These programs directly commission officers and then send them to indoctrination training often giving them credit in the form of advanced rank for their professional skills. These direct commission programs are of such a specialized nature that they are not totally germane to the topic of future naval officers. Table 5-1 displays FY1997 Navy Officer Accessions by source of commission. Figure 5-1 displays recent trends in officer accessions. The percentage of ROTC and Direct Appointment accessions has been decreasing over the past several years while the proportion of Naval Academy and OCS accessions has increased.

1. Programs for High School and College Students

Programs for high school and college students include USNA, NROTC Scholarship Program, and the Non-Scholarship NROTC Program. These programs provide the majority of the officer accessions especially into the unrestricted line communities. In addition, these programs provide more firm specific training than the other programs and individuals in these programs typically demonstrate more loyalty to the Navy as witnessed by higher retention rates. See Table 5-2. However, the weakness of these programs is their long lead time, namely the four years of a college education. This long lead time hinders the ability of manpower managers to use these programs exclusively to meet annual end strength requirements.

⁵⁷ Professionals in this context refers to people who have obtained a "professional" skill such as medicine or law.

⁵⁸ Students in the Enlisted Commissioning Program instead of attending military science classes as a part of the ROTC program attend a 7 week course at the Naval Science Institute in Newport, Rhode Island.

⁵⁹ This program category encompasses the recruitment of professionals into the staff corps and the commissioning of senior enlisted personnel as limited duty officers and warrant officers.

Officers by Source of Commission

Source of Commission	Number of Officers	% of New Officers
<u>Programs for High School and College Students</u>		
Naval Academy	811	19.7%
NROTC Scholarship	691	16.8%
NROTC Non-Scholarship	73	1.8%
<u>Programs for College Graduates</u>		
OCS	899	21.8%
<u>Programs for Junior and Senior Enlisted Personnel and Professionals</u>		
Direct Appointment	1087	26.4%
Other/Unknown	563	13.2%
TOTAL	4124	100%

Table 5-1. FY97 Navy Officer Accessions by Source of Commission (Source: Defense Manpower Data Center Interactive Data Management System, Dec. 1997)

Retention by Accession Source

Accession Source	Number of Officers Completing a 20 Year Career Out of an Initial 100
USNA	21.1
NROTC Scholarship	15.3
NROTC Non-scholarship	13.9
OCS	15.5
OVERALL AVERAGE	13.6

Table 5-2. 20 Year Cumulative Continuation Rate By Accession Source (Source: OPIS Database, 1997)⁶⁰

⁶⁰ Number of Officers Completing a 20 Year Career Out of an Initial 100 = 100 * Product of the Average Year of Completed Service (YCS) Continuation Rate from YCS 0 to YCS 20 for 1975 through 1996.

Percentage of Officer Accessions by Source

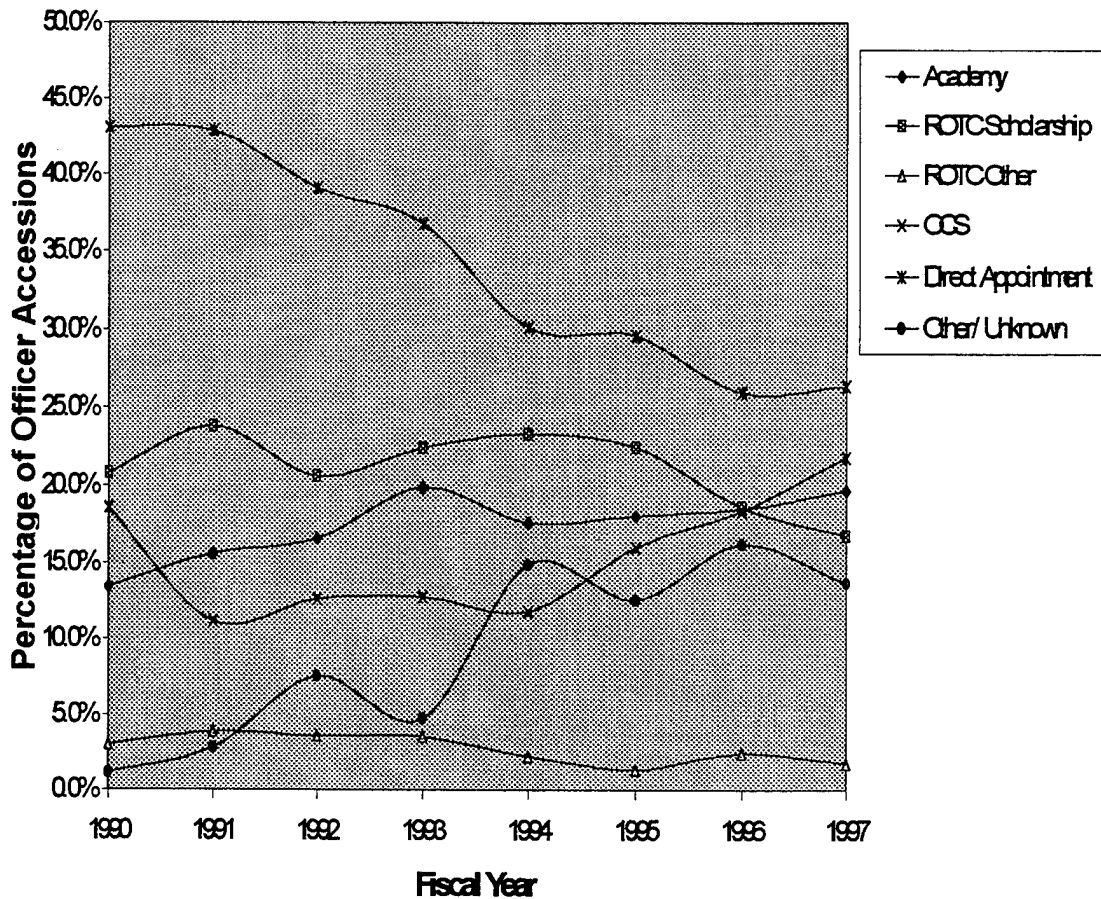


Figure 5-1. Accession Source Trends (Source Defense Manpower Data Center, Dec. 1997)

The unifying characteristic of these programs is that they lead to a college degree and a commission as an officer in the Navy. Officer candidates are recruited primarily through direct mailing, school guidance and career counselors, and the internet. The screening requirements for these programs are given in Table 5-3. Once selected, officer candidates attend college full time, but are required to take some additional courses in technical areas, military science, and leadership. The result of these programs is a reserve commission as an ensign in the Navy or as a second lieutenant in the Marine Corps.

Naval Academy and NROTC Candidate Screening Requirements

Screening Requirement	Naval Academy	ROTC
Citizenship	USA	USA
Age	17-23	17-27
Dependent Status	No Dependents	N/A
Nomination	- Congressional Nomination - Presidential or Vice Presidential Nomination, - Active/ Reserve Navy/ Marine Corps Nomination, - NROTC/ JNROTC Nomination, - Children of Disabled/ Deceased Veterans and POW/MIAs Nomination, Medal of Honor Winner Nominations	N/A
SAT/ACT	No Set Minimum Recommended Minimum SAT: Verbal - 530 Math - 600 ACT: English - 22 Math - 26	Set Minimums SAT: Verbal -530 Math -520 ACT: English - 22 Math - 22

Table 5-3. Naval Academy and NROTC Candidate Screening Requirements (Source: United States Naval Academy Website, 21 May 1998 and *OPNAVNOTE 1533: 1999 NROTC Scholarship Programs*, 13 March 1998)

Naval Academy and NROTC Candidate Screening Requirements (CONT)

Screening Requirement	Naval Academy	ROTC
Scholastic Record	College Preparatory: 4 Years of Math including Trigonometry 4 Years of English 2 Years of a Modern Foreign Language 1 Year of Physics 1 Year of Chemistry 1 Year of European/World History	Not Specifically Mentioned as a Requirement
Medical	Medically Qualified to serve in the Unrestricted Line	NROTC Specific Requirements
Physical	300 YD Shuttle Run Kneeling Basketball Throw Standing Long Jump Pulls-Ups (Men)/ Flexed Arm Hang (Women).	N/A

Table 5-3. Naval Academy and NROTC Candidate Screening Requirements (CONT) (Source: United States Naval Academy Website, 21 May 1998 and *OPNAVNOTE 1533: 1999 NROTC Scholarship Programs*, 13 March 1998)

2. Programs for College Graduates

In order to meet officer end strength goals, the Navy uses programs targeted at college graduates. Officers in this category attend the OCS for indoctrination and then are commissioned and are sent to serve in the area for which they were recruited. These officers typically already have a college degree and thus do not have long lead times before commissioning. Consequently, these officer candidates are less expensive to access and give Navy manpower managers more leeway in meeting end strength requirements.

The OCS indoctrination at Newport, Rhode Island lasts 16 weeks and includes physical training, close order drill, leadership training, engineering courses, and naval science courses. Officer candidates in this group are recruited largely through college career fairs, college career counselors, direct mailings, and the internet. Candidates are screened into these programs using the Officer Aptitude Rating (OAR), their college grade point averages, extracurricular activities, employment record, and physical examination results. The OAR is a composite of the aviation selection test battery (ASTB) which measures academic, mechanical, and spatial aptitudes. Candidates are generally required to score at least a 40 on the OAR.⁶¹

C. OFFICER DEVELOPMENT

There are four major components of officer development in the Navy: the development of leadership skills, the development of a primary warfighting/support skill, the development of a specialty, and the obtainment of joint duty qualification. Leadership training is conducted throughout the officers career, while primary warfighting/support skill training is given after the officer is granted a commission or becomes a warrant officer and at periodic intervals throughout an officer's career. Each officer is given skills training in their chosen primary field, and it is this training that sets each officer on the path for their specific community.

Specialty education and joint duty training are given at certain times in the individuals career dependent on the needs of the warfighting/support community that the officer belongs to. Officers obtaining a specialist training or education earn a subspecialty code and are consequently managed differently dependent on their specialty. Finally, the Goldwater-Nichols Act of 1986 requires almost all officers to be joint warfare qualified through both joint education and joint tour experience before attaining flag rank.

In this section, I will briefly discuss officer leadership development, warfighting/support skill development for the major officer groupings, the subspecialty system, and the

⁶¹ Mark Eitelberg, Janice Laurence, and Dianne C. Brown, *Becoming Brass: Issues in the Testing, Recruiting, and Selection of American Military Officers*, (Josey and Bass Co: San Francisco, CA, 1989), pp. 36-57.

joint duty qualification process. There will be an emphasis on the unrestricted line group of communities.

1. Officer Leadership Development

Naval leadership is developed over an officer's entire career. Leadership development encompasses both on-the-job training and formal class room instruction. On-the-job training occurs continually while the officer is assigned to both sea and shore assignments. To complement the on-the-job leadership training, the Navy provides formal classroom instruction in three distinct, but supporting stages. The first stage is leadership development courses during all officer accession programs. These programs emphasize integrity, moral courage, ethical behavior and responsibilities, standards of conduct, personal behavior, and Navy core values. The second stage is the leadership continuum. The leadership continuum is a series of short courses given at the division officer, department head, executive officer, and the commanding officer level. The continuum is focused on the application of core values. The third and final stage is intermediate and senior level professional military education. This stage is given at the Naval War College, the Naval Postgraduate School and other Service colleges and is accomplished through the integration of leadership, character, and ethics into the course work to obtain a knowledge of the ethical dimension of the profession at arms and an understanding of the ethical considerations of developing warfighting disciplines.⁶²

2. The Unrestricted Line Officer's Primary Warfighting Skills Development

a. Surface, Submarine, and Aviation Officers

The career paths for surface warfare officers, submarine warfare officers, and aviators are similar in design. Each path has five major milestones: a division officer tour, a department head tour, an executive officer tour, a commanding officer tour, and a major command tour. The communities differ with regards to the timing of these milestone billets and in some cases the community will require the officer to serve in multiple milestone billets. See

⁶² Chief of Naval Education and Training, "Navy Officer Military Education Policy- Draft," 19 December 1997.

Figure 5-2 for the career paths for the standard career paths for surface warfare officers, submarine warfare officers, and aviators. More detailed career path figures are in Appendix B.

Each community's division officer tour is preceded by initial skills training. This training ranges from 22-25 weeks for surface warfare officers to 50-70 weeks for pilots.⁶³ Surface Warfare training is conducted at Surface Warfare Officer School (SWOS) and consists of four phases: an 11 week operations and combat systems phase, a 6 week platform engineering phase, a 3-6 week billet specialty phase, and the 2 week division officer installment of leadership continuum training.⁶⁴ A small group of surface warfare officers attend the 24 week Nuclear Power School and the 24 week Nuclear Prototype Training Unit prior to attending SWOS in order to serve in the engineering departments of the nuclear surface fleet. Submarine warfare officers attend the 24 week Nuclear Power School and the 24 week Nuclear Prototype Training Unit acquiring the necessary skills to operate the submarine nuclear reactors. After nuclear reactor training, submarine officers attend the 12 week Submarine Officer Basic Course (SOBC) at the Submarine School. SOBC consists of a 10 week introduction into submarine operations and combat systems and the 2 week division officer installment of the leadership continuum. In addition, submarine officers attend one week short courses in sonar, navigation/ communication, missile employment, torpedo employment, and junior officer tactics during the first year of their division officer tour.⁶⁵ The aviator initial skills training pipelines are displayed in Figures 5-3 and 5-4. The pipeline for pilots ranges from 50 to 70 weeks of instruction while the NFO pipeline ranges from 40 to 60 weeks of instruction. This training is initially very general in nature as the aviators attend either Primary Flight Training or Basic Naval Flight Officer Training. After the completion of this phase, the aviators are separated into different training paths dependent on the platform in which they are ultimately going to specialize. After completion of the training pipeline, aviators are sent to the Fleet Replenishment Squadron commonly referred to as the "RAG" for the acquisition of platform specific training in operations and tactics.

⁶³ The variable training length is due to different platforms and different billets requiring additional training.

⁶⁴ Surface Warfare Officer School Website, "Division Officer Course Overview," 8 August 1998.

⁶⁵ Naval Submarine School Website, "Officer Training," 8 August 1998.

Surface/Submarine/Aviation Career Path

CAPT	24 -	Major Command		
	22 -	Joint/Staff Shore Tour	Joint/Staff Shore Tour	Joint/Staff Shore Tour
	20 -		Senior Service College	
CDR	18 -	Senior Service College	Commanding Officer Tour (33 Months)	Commanding Officer/ Executive Officer Tour
	16 -	Commanding Officer Tour (24 Months)		Fleet Replenishment Squadron
	14 -	Staff/Joint/JPME Tour	PCO School	Shore Tour (24 Months)
	12 -	XO Tour	Shore Tour (24 Months)	
LCDR	10 -	PXO School	XO Tour (22-24 Months)	Department Head Tour (36 Months)
	8 -	Shore Tour	PXO School	
	6 -	Second Department Head Tour (18-24 Months)	Shore Tour (24 Months)	Fleet Replenishment Squadron
	4 -	First Department Head Tour (24 Months)	Department Head Tour (30-36 Months)	Disassociated Sea Tour (24 Months)
LT	2 -	SWOS DH (5 Months)		Shore Tour (36 Months)
	0 -	Shore Tour (24 Months)	SOAC (5 Months)	
		Second Division Officer Tour (18 Months)	Shore Tour (24 Months)	First Squadron Sea Tour (36 Months)
LT JG		First Division Officer Tour (24 Months)	Division Officer Tour (36 Months)	
ENS		Surface Warfare Officer School	Nuclear Training and Submarine Officer Basic Course	Flight School and Initial Fleet Replenishment Squadron
		Surface	Submarine	Aviation

Figure 5-2. Unrestricted Line Officer Career Path (Source: Navy Bureau of Personnel Perspective, Jan-Feb 1998)

The division officer tour for surface warfare officers is divided into two separate tours. The first, is approximately 24 months long while the second, is 18 months long. Aviators have two "division officer" tours which are broken up by a 36 month shore tour. The second "division officer" tour for aviators is a disassociated sea tour in which the aviator serves in a sea billet that is not in his primary warfighting area. Aviators will attend the Intermediate Leadership Continuum Course before their disassociated sea tour. Submarine officers have one division officer tour of 36 months in length. After the division officer tour (for aviators between the division officer tours), officers are assigned to shore duty, either in an institutional support billet, obtaining an advanced degree, or both.

In each community, the department head tour is preceded by a screening board and additional training in their primary warfare specialty. The screening board occurs at different points in each of the communities, but it has the common purpose of weeding out poor performers. After being screened for department head, aviators return to the Fleet Replenishment Squadron for refresher training and advanced training in tactics, operations and the designated leadership continuum course (the Advanced Leadership Continuum Course). The length of training is dependent on the specific platform. Surface warfare officers return to SWOS for the 24 week long department head course. The department head course includes the two week department head installment of the leadership continuum (Intermediate Level), 8 weeks of combat systems commonly referred to as the TAO Core (Tactical Action Officer), 2.5 weeks of afloat safety and shipboard readiness training, 4 weeks of engineering and damage control, 5 weeks of tactical employment training, and 2.5 weeks of billet specialty training.⁶⁶ Submarine warfare officers attend the 22 week Submarine Officer Advanced Course (SOAC) at the Submarine School. SOAC is intended "to provide submarine qualified mid-career officers with training in the advanced aspects of submarine warfare related areas and to prepare them to

⁶⁶ Surface Warfare Officers School Website, "From the Director, Department Head Training Department," 8 Aug . 1998.

Naval Pilot Training Pipeline

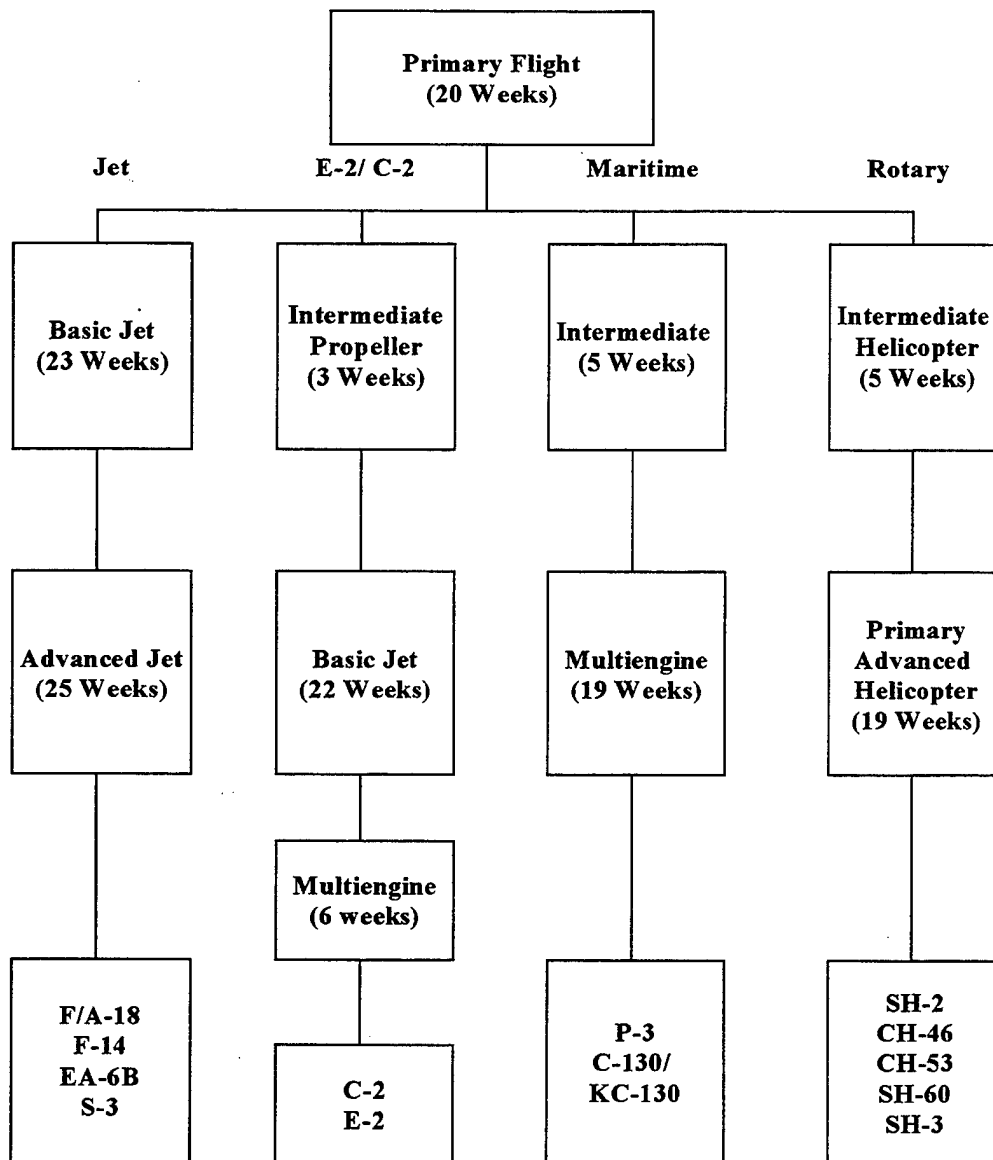


Figure 5-3. Naval Pilot Training Pipeline (Source: The Naval Officer Career Planning Guide, 1990)

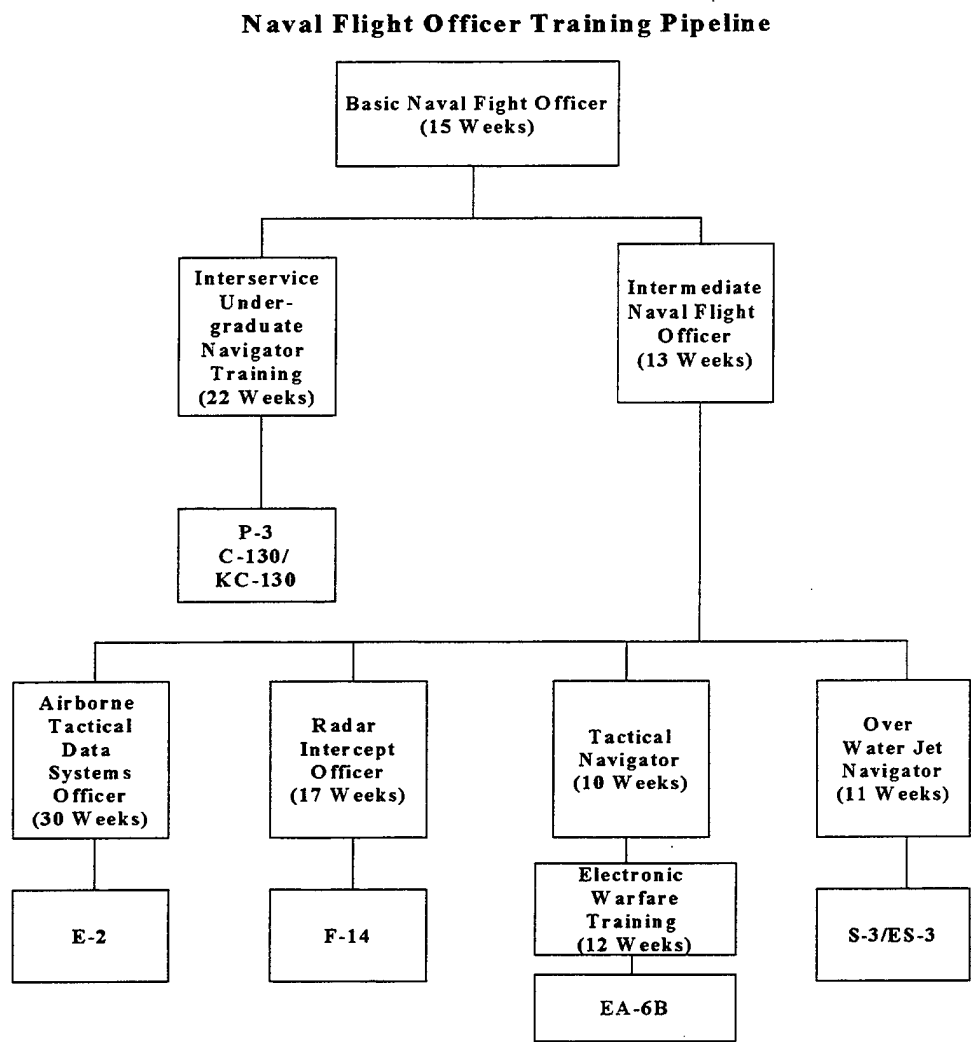


Figure 5-4. Naval Flight Officer Training Pipeline (Source: The Naval Officer Career Planning Guide, 1990)

assume the responsibilities as one of the commanding officers principle tactical assistants."⁶⁷ The two week intermediate level leadership continuum course is part of the 22 week SOAC curriculum.

Surface warfare officers like their division officer tours have split department head tours of 24 months and 18 months. Submarine warfare officers have one 30 to 36 month department head tour as do aviators. After the department head tour, all three communities have a shore tour of about 24 months in length. This is followed by XO screening and prospective executive officer (PXO) school for surface warfare officers and submarine warfare officers. PXO school for surface warriors is again at SWOS and consists of 6 weeks of training in shipboard management, advanced tactics, material readiness and management.⁶⁸ PXO school for submarine warfare officers is at the Submarine School and includes topics in advanced tactical sensor and weapons employment and submarine management and administration.⁶⁹ Aviators return to the fleet replenishment squadron for training in tactics and management. In addition, surface warfare officers and submarine officers are required to attend the two week advanced officer leadership continuum training.

For aviators, the XO tour leads directly into the commanding officer tour. For the surface and submarine communities, there is a 24 month shore tour after the XO tour as these officers are screened for command. Both surface and submarine officers have a prospective commanding officer course (PCO). The surface warfare PCO course is again at SWOS. It last 9 weeks and is focused on the development of a command perspective, material readiness, risk assessment based decision making, and tactical training.⁷⁰ The submarine officer PCO course lasts about six months and includes training in tactics and administration at the Submarine School, in nuclear engineering at Naval Reactors in Washington D.C., and additional tactics training on board operational submarines. Finally, all officers are required to attend the commanding officer installment of the leadership continuum.

⁶⁷ Naval Submarine School Website, "Officer Training," 8 August 1998.

⁶⁸ Surface Warfare Officers School Website, "Prospective Executive Officer Overview," 8 Aug . 1998.

⁶⁹ Naval Submarine School Website, "Officer Training," 8 August 1998.

⁷⁰ Surface Warfare Officers School Website, "Prospective Commanding Officer Course Overview," 8 Aug . 1998.

The command tour is followed by a senior service college education and/ or a staff tour on a Navy or joint staff. The last milestone in the typical surface, submarine, aviator career path is obtaining a major command. Major commands include aircraft carriers, submarine squadrons, etc. These officers are again screened for these positions and again are offered training in this case at SWOS to bring them up to speed in the area of their command. The major command course is 2 weeks long and is tailored to meet the needs of the individual commander.⁷¹ Aviators selected to be XO and CO of nuclear powered aircraft carriers are required to attend the nuclear power pipeline.

b. Special Warfare Officers

Special Warfare Officers concentrate on the development of skills in the areas of unconventional warfare, counter-insurgency, coastal and riverine interdiction, and tactical intelligence collection. The career path for special warfare officers is similar to the other URL officers but there are some significant differences. See the special warfare career path displayed in Figure 5-5. The initial training for special warfare officers is at Basic Underwater Demolition/SEAL training (BUDS). BUDS is a grueling 6 month school that gives the special warfare officer skills in all phases and forms of hydrographic reconnaissance, land and underwater demolitions, individual and crew served weapons, small unit tactics, land reconnaissance, and various types of scuba. After BUDS training, the first milestone of a special warfare officer is assignment to a seal team or Seal Delivery Vehicle (SDV) team as an assistant platoon commander. After about two years as an assistant platoon commander, the special warfare officer will be transferred to another team to serve as a platoon commander for two years. At this point, he will rotate ashore for about two years either (1) to obtain a post-graduate degree, (2) serve as an instructor at a special warfare command, or (3) serve at a naval special warfare unit. The major milestones after this are (1) screening for department head and the subsequent department head tour of about 3 years in length, (2) XO screening

⁷¹ Surface Warfare Officers School Website, "Prospective Major Command Commanding Officer page," 8 Aug . 1998.

and the subsequent XO tour, and finally (3) CO screening and the subsequent two year command tour of a SEAL team or SDV team. In between these milestones, the special warfare officer will rotate ashore just like the other communities and after his command tour will be screened for the possibility of a major command tour and subsequent promotion to captain.⁷² Special Warfare officers attend the leadership continuum in a manner similar to other URL officers.

c. Special Operations Officers

Special operations officers develop skills, knowledge, and abilities in four key functional areas:

- (1) Expendable Ordnance Management (EOM)
- (2) Mine Countermeasures (MCM)
- (3) Explosive Ordnance Disposal (EOD)
- (4) Diving and Salvage (D&S)

Each special operations officer is expected to specialize in two of these functional areas by completing repeat operational tours within these functional areas before reaching the commander promotion milestone. Each officer will have a primary specialty in either EOM or MCM and a secondary specialty in EOD or D&S. This ensures that all special operations officers will have general diving expertise, and that most officers will share at least one specialty. The typical career path for a special operations officer is displayed in Figure 5-5.

The initial skills training for a special operations officers starts with SWOS with the surface warfare community and then separates to 13 weeks of basic diving officer training. Additional training is given dependent on the initial tour of the special operations officer. After the initial training, officers are assigned to a ship for 30 months. The next milestone is specialty

⁷² Navy Bureau of Personnel, *Perspective* (Jan-Feb 1998), p.33, and Navy Bureau of Personnel, *The Naval Officers Career Planning Guidebook*, NAVPERS 15605, (1990), pp. 42-47.

Special Warfare/ Special Operations Career Paths

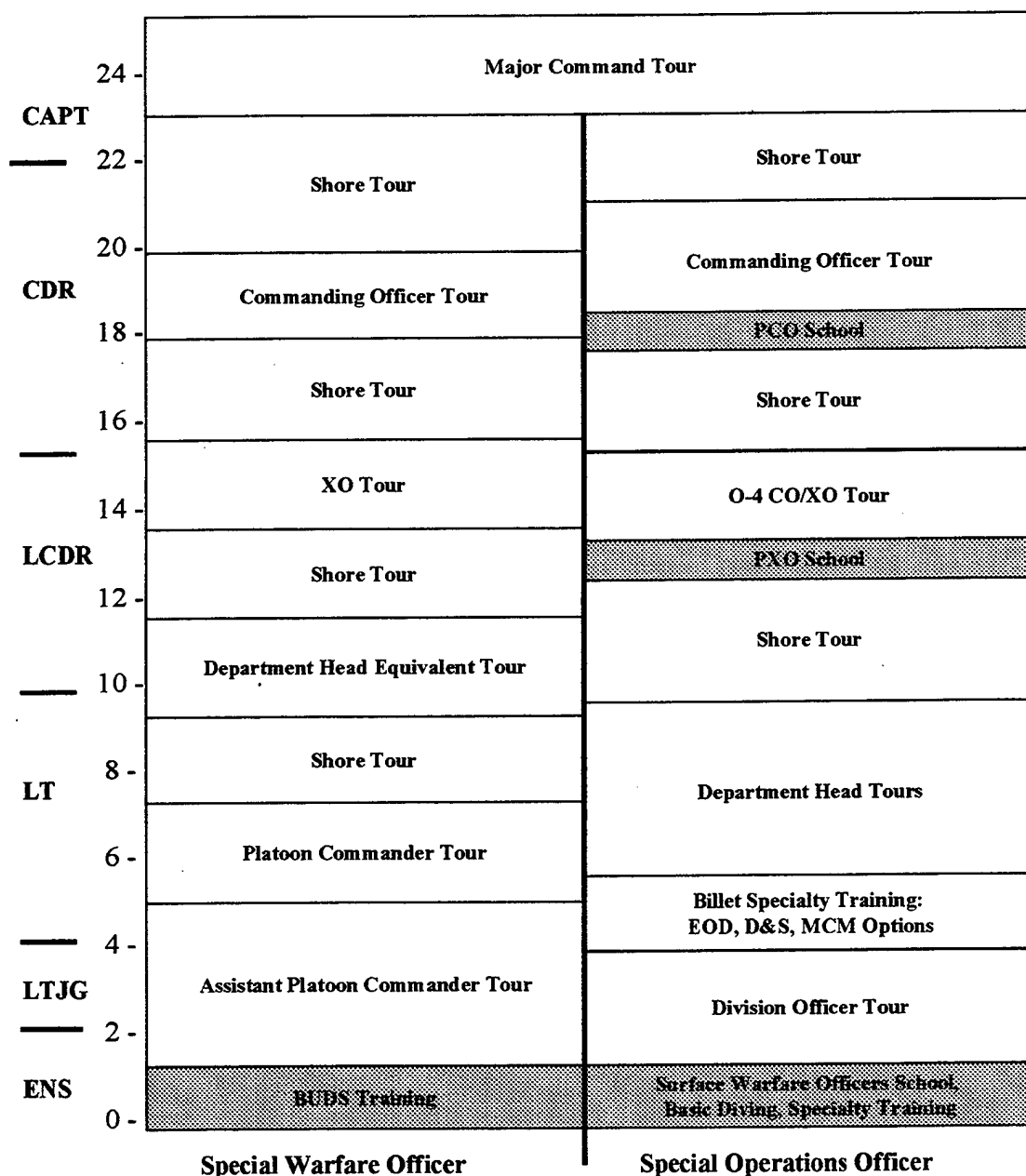


Figure 5-5. Special Operations/Special Warfare Officer Career Paths (Source: The Naval Officer Career Planning Guide, 1990)

billet training and a second 24 month sea tour. The remainder of a special operation officer's career is dependent on his specialties and is very diverse with multiple sea and shore billets.⁷³

Special Operations officers attend the leadership continuum in a manner similar to other URL officers.

3. Restricted Line Officers Primary Warfighting/ Support Skills Development

RL officers have career paths that are very different from the unrestricted line model. Three of the communities (engineering duty officer, aerospace engineering duty officer, and public affairs officers) access officers through lateral transfer from the unrestricted line communities after the first or second sea tour. The meteorological/ oceanographic community accesses officers both through lateral transfer and through direct commissioning. The rest of the RL communities access largely through direct commissioning, but there are still lateral entry openings. Each RL community uses a postgraduate education and repeat specialty tours to give their officers experience in their field. Unlike the URL communities, there are typically no tours outside the officers specialty. See Appendix B for typical RL career paths in the Engineering Duty Officer career path and the Intelligence Officer career path.⁷⁴ Restricted Line officers attend the leadership continuum in a manner similar to URL officers.

4. Staff Officers Primary Warfighting/ Support Skills Development

Staff corps officers like restricted line officers serve repeat tours in their professional area. Most of the officers in these fields are directly commissioned after college, but there are programs that allow a limited amount of lateral transfers. All of the communities in this group rely heavily on advanced education either as a prerequisite for entering the community or as a key milestone in officer development. Sample staff corps career paths are displayed in Appendix B in the Judge Advocated General Corps officer career path and the Civil

⁷³ Navy Bureau of Personnel, *Perspective* (Jan-Feb 1998), p.33, and Navy Bureau of Personnel, *The Naval Officers Career Planning Guidebook*, NAVPERS 15605, (1990), pp. 47-52.

⁷⁴ Navy Bureau of Personnel, *The Naval Officers Career Planning Guidebook*, NAVPERS 15605, (1990), pp.68-88.

Engineering Corps career path.⁷⁵ Staff officers attend the leadership continuum in a manner similar to URL officers.

5. Limited Duty Officers and Chief Warrant Officers

Limited duty officers and chief warrant officers typically serve as technical managers and specialists in fields related to their former enlisted rating. With 60 specialties within these grouping, there is no set career path for these officers. These officers typically serve repeat tours in their specialty field like restricted line officers and staff officers.

6. The Subspecialty System

In addition to their primary warfare specialty, officers can obtain a subspecialty through post-graduate education or through significant experience in a specialist billet. Officer subspecialists are managed through the Navy subspecialty system. Each officer after completing the required education skill requirements or the required experience level is given a 5 digit subspecialty code. This code is then used to help assign the officer to billets in which the officer can use his subspecialty. In general, the subspecialty system is designed to meet the needs of the Navy's shore establishment. Officers in the unrestricted line use their specialty primarily while on shore duty. The other officer groups use their specialty during most if not all of their tours. Table 5-4 lists the officer subspecialties.

Officer Subspecialty Codes	
Subspecialty Code	Number of Officers
10 PUBLIC AFFAIRS	44
11 ENGLISH	18
12 HISTORY	30
16 JOINT INTELLIGENCE	99

Table 5-4. Officer Subspecialty Codes (Source: Bureau of Personnel Subspecialty Status Report, Oct 1995.)

⁷⁵ *Ibid.*, pp. 91-100.

Officer Subspecialty Codes (CONT)

Subspecialty Code	Number of Officers
17 SCIENTIFIC AND TECHNOLOGICAL INTELLIGENCE	128
18 REGIONAL INTELLIGENCE	10
19 OPERATIONAL INTELLIGENCE	13
20 GENERAL POLITICAL SCIENCE	81
21 REGIONAL STUDIES: MIDDLE EAST/ AFRICA/ ASIA	36
22 REGIONAL STUDIES: FAR EAST, PACIFIC	46
23 REGIONAL STUDIES: WESTERN HEMISPHERE	44
24 REGIONAL STUDIES: EUROPE/ RUSSIA	84
28 STRATEGIC PLANNING	162
29 SPECIAL OPERATIONS/ LOW INTENSITY CONFLICT	13
30 GENERAL MANAGEMENT	8
31 FINANCIAL MANAGEMENT	562
32 MATERIAL MANAGEMENT	196
33 MANPOWER ANALYSIS	250
34 TRANSPORTATION MANAGEMENT	44
37 EDUCATION/ TRAINING MANAGEMENT	195
41 APPLIED MATH	39
42 OPERATIONS ANALYSIS	339
43 OPERATIONAL LOGISTICS	39
44 UNDERSEA WARFARE	208
45 C4 SYSTEMS	102
46 INFORMATION WARFARE	70
47 METEOROLOGY/ OCEANOGRAPHY	209
48 METEOROLOGY	7
49 OPERATIONAL OCEANOGRAPHY	108
50 GENERAL NAVAL ENGINEERING	2
51 NAVAL CONSTRUCTION	141
52 NUCLEAR ENGINEERING	129
53 NUCLEAR PROPULSION	270
54 NAVAL MECHANICAL ENGINEERING	444
55 ELECTRICAL ENGINEERING	325
62 CHEMIST	16
66 COMBAT SYSTEMS	390
68 STRATEGIC WEAPONS	26
69 STRATEGIC NAVIGATION	4

Table 5-4. Officer Subspecialty Codes (CONT) (Source: Bureau of Personnel Subspecialty Status Report, Oct 1995.)

Officer Subspecialty Codes (CONT)

Subspecialty Codes	Number of Officers
71 AEROSPACE ENGINEERING	289
72 AEROSPACE AVIONICS	88
73 FLIGHT PERFORMANCE/ TEST PILOT	27
76 SPACE SYSTEM OPERATIONS	113
77 SPACE SYSTEM ENGINEERING	119
89 INFORMATION TECHNOLOGY MANAGEMENT	593
91 COMPUTER SCIENCE	198
1101 FACILITY ENGINEERING	563
1102 PETROLEUM ENGINEERING	7
1103 OCEAN ENGINEERING	52
1200 GENERAL LEGAL	2
1201 MILITARY JUSTICE CRIMINAL	45
1203 OCEAN/ INTERNATIONAL LAW	58
1204 TAX LAW	3
1205 HEALTHCARE LAW	15
1206 LABOR LAW	13
1207 ENVIRONMENTAL LAW	23
1300 GENERAL SUPPLY	66
1301 SUPPLY ACQUISITION	170
1302 SYSTEMS INVENTORY MANAGEMENT	62
1304 TRANSPORTATION LOGISTICS MANAGEMENT	55
1305 RETAILING	41
1306 ACQUISITION/ CONTRACT MANAGEMENT	205
1307 PETROLEUM MANAGEMENT	31
1308 SUBSISTENCE TECHNOLOGY	6
1400 GENERAL RELIGION	11
1410 HOMILY/ LITURGY	41
1420 RELIGIOUS EDUCATION	30
1430 RELIGIOUS CULTURE	19
1440 PASTOR/ COUNSEL	94
1450 ETHICS	18
1460 TRAINING/EDUCATION MANAGEMENT	5
1470 ECCLESIASTICAL COMMUNION	5
TOTAL	7998

Table 5-4. Officer Subspecialty Codes (CONT) (Source: Bureau of Personnel Subspecialty Status Report, Oct 1995.)

7. Joint Duty Qualification

In 1986, Congress signed into law the Goldwater-Nichols Act which requires almost all officers to be joint duty qualified before promotion to flag rank. This requirement was the result of a perceived shortfall in the development of military officers in the joint arena. Goldwater-Nichols states that officers who are to be joint duty qualified as a Joint Specialty Officer have to complete both a Joint Professional Military Education (JPME) Program and a Joint Duty Assignment. The JPME program is offered at the National War College and the Industrial College of the Armed Forces in a one phase program and is offered at the Service Colleges and the Armed Forces Staff College in a two phase program.⁷⁶ The joint duty assignment is a two year tour for flag officers and a three year tour for O-4 through O-6.⁷⁷ Members of the staff corps namely JAG officers, medical officers, dentists, chaplains, nurses, and medical service corps officers are exempted from this requirement. In addition, some officers in the nuclear power field and some officers with the approval of the Secretary of Defense may have this requirement temporarily waived.⁷⁸ The Goldwater-Nichols joint duty requirement has placed a great strain on Navy career planning as officers have tried to balance primary warfighting skills and joint requirements within a 30 year career.

D. PROMOTING

Promotion is the movement of individuals through the organizational structure of the Navy. As currently designed, the Navy has a structure of 10 commissioned officer ranks, ensign through admiral, and 5 warrant officer ranks as introduced in Chapter IV. Promotion decisions are based on an individuals fitness reports, picture, personal awards, any

⁷⁶ Phase I JPME is accomplished at the Service Colleges, the Naval Postgraduate School, or through a non-residential program. Phase II is accomplished at the Armed Forces Staff College.

⁷⁷ Officers in critical occupational specialties can shorten their joint duty assignment to two years if going to an operational navy billet.

⁷⁸ Naval Bureau of Personnel, *Perspective*, (Jan-Feb 1998), pp. 11-12.

correspondence that the officer has submitted to the board, and any other matters of official record.⁷⁹

The Defense Officer Personnel Management Act of 1980 (DOPMA) governs flow between the ranks using an "Up-or-Out" design whereby those that are not promoted are forced out of the organization at certain years of service plateaus called High Year Tenure (HYT) points.

Under DOPMA, all qualified ensigns are promoted to lieutenant junior grade within two years of service and almost all qualified lieutenant junior grades are promoted to lieutenant at or around four years of service. After this point, promotion becomes more competitive. Lieutenants are considered for promotion to lieutenant commander at the 10 year point plus or minus 1 year. DOPMA specifies a target promotion rate of 80 percent for promotion to lieutenant commander. Lieutenants are separated for HYT if they fail to be selected for lieutenant commander in two promotion opportunities, a one year in-zone opportunity and a one year above-zone opportunity. HYT for Navy lieutenants typically occurs around 11 to 12 years of service.

The next DOPMA promotion gate is to commander, and it occurs at the 16 year mark plus or minus 1 year. The Navy has modified the commander promotion zone so that it starts in year 15. The other three services promote O-4s to O-5 at the 16 year point. DOPMA specifies a target promotion rate of 70 percent for selection to commander. In addition, lieutenant commanders, like lieutenants, have two promotion opportunities to commander. HYT separation for lieutenant commanders who fail to select to commander is at the 20 year mark which coincides with the minimum service obligation for retirement benefits.

In year of service 22, officers are considered for promotion to captain. The DOPMA specified promotion rate target for promotion to captain is 50 percent. HYT for commanders who fail to select to captain is 28 years, but DOPMA allows for the mandatory separation of 30 percent of the commanders who have been passed over twice for promotion to captain. Statistics on promotion to flag rank are not published, but selection from captain to rear

⁷⁹ *Ibid.*, p. 14.

admiral is "known" to be less than 10 percent and is "known" to occur somewhere around the 27th year of service. HYT for captains is 30 years, but DOPMA allows for the mandatory separation of captains after serving four years in grade.⁸⁰ Table 5-5 summarizes the promotion zones and the promotion opportunity and Figure 5-6 displays the Officer inventory by years of service and paygrade with the applicable force shaping tools annotated.

Summary of DOPMA and Navy Career Promotion Zones and Opportunities						
Source	Criterion	O-3	O-4	O-5	O-6	O-7
DOPMA	YOS AT PROMOTION	3-5	9-11	15-17	21-23	NA
	SELECTION RATE	100%	80%	70%	50%	NA
	HYT	12-13	20	28	30	NA
NAVY	YOS AT PROMOTION	4	10	15	22	27
	SELECTION RATE (FY98)	-	75.8%	80.1%	58.0%	NA

Table 5-5. Summary of DOPMA and Navy Career Promotion Zones and Opportunities
(Source: Beth Asch and John T. Warner, *A Theory of Military Compensation and Personnel Policy*, 1994 and Tom Lawson, Bureau of Naval Personnel, fax to Tim Smith, 14 Oct 1997.)

⁸⁰ Beth J. Asch and John T. Warner, *A Theory of Military Compensation and Personnel Policy*, (RAND: Santa Monica, CA, 1994), pp. 7-11, and Department of the Navy, *The Naval Officer's Career Planning Guidebook*, NAVPERS 15605, (19900, p. 5.

Inventory by Years of Service and Paygrade with Force Shaping Methods

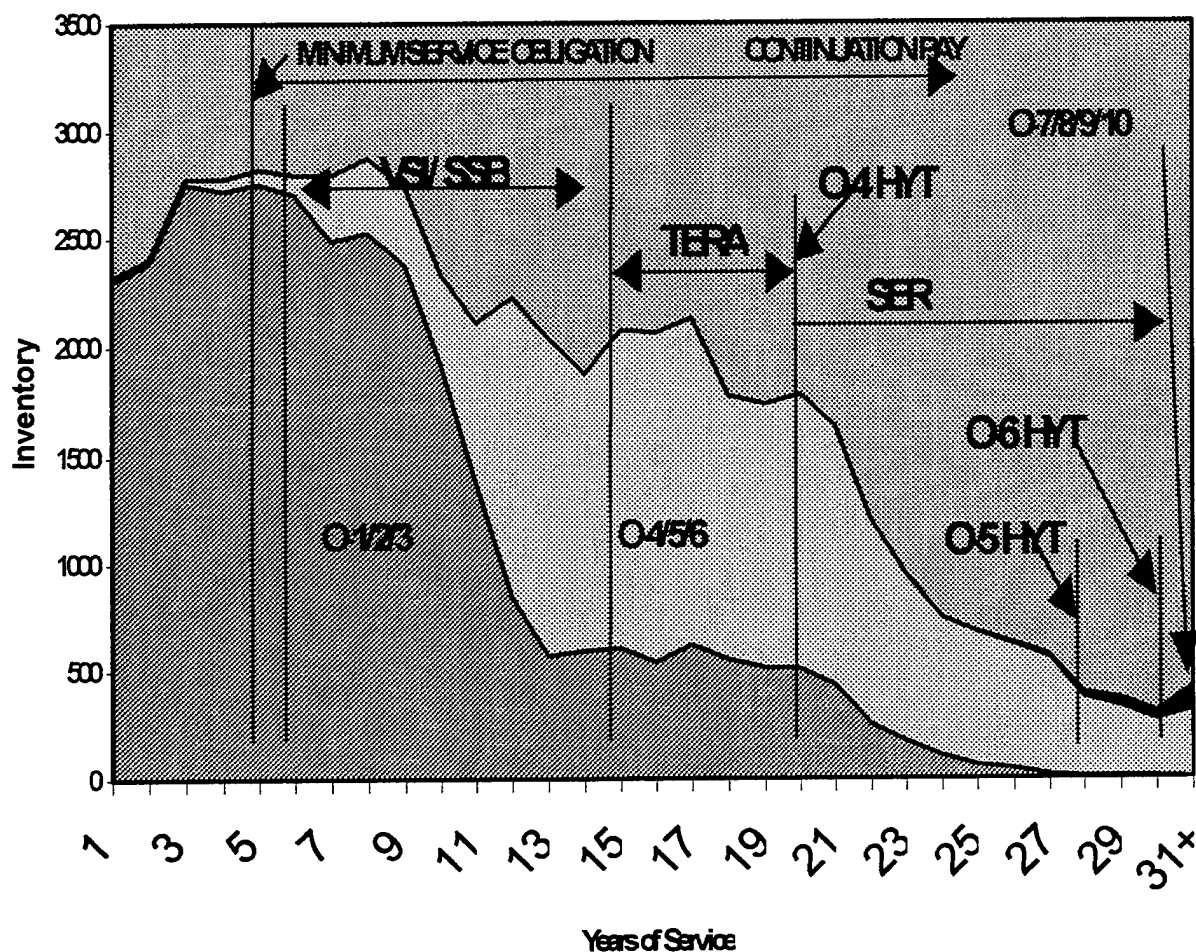


Figure 5-6. FY1997 Officer Inventory by Year of Service and Paygrade (Source: Defense Manpower Data Center, 1997)

E. ASSIGNMENT

Assignment in the Navy is performed through the centralized detailing process in which officers are assigned to specific units and in most cases specific billets. Community detailers attached to the Navy Manpower Personnel Command/Bureau of Personnel manage the process by balancing the desires of the individual officer, the officers career development

needs, and the needs of the Navy. The detailing process is how the Navy executes the development of its officers.

F. COMPENSATION

The military compensation system consists of a complex patchwork of active duty pays, allowances, retired pay, and non-pecuniary benefits. Active duty pays can be divided into two categories. The first and largest active duty pay category is base pay, which is the same for everyone within a certain paygrade and a certain year of service. Base pay increases with promotion and years of service. The second category is special and incentive pays. This category unlike base pay depends on the individual circumstances. Examples of special pay include nuclear and aviation continuation pays, submarine pay, career sea pay, hostile fire pay, medical officer special pay, and divers pay.

Allowances include compensation for housing and food. The housing allowance is based on rank, location, and marital/ dependent status. The food allowance is the same for all officers. Allowances are non-taxable income therefore when comparing military and civilian wages one should account for the tax benefit of the housing and food allowance.

Retired pay is the amount funded to offset the accumulating retirement liability of those on active duty. To be entitled to retirement benefits the officer has to serve 20 years unless he joins the reserves and accumulates enough reserve credit to begin receiving reserve retired pay at age 60. Personnel who separate prior to the 20 year mark receive no benefits. There are currently three retirement systems in effect. The first system applies to personnel who joined the service before FY 1981. Their retired pay is equal to $(0.025 * \text{years of service} * \text{final basic pay})$ so a 20 year retiree will earn 50% of his final base pay and a 30 year retiree will earn 75% of his final base pay. The second retirement system applies to personnel who joined the service between FY 1981 and FY 1986. It uses the same formula as the first system, but substitutes the final base pay with the individual's high three year's average basic pay. Both the first and second retirement systems are fully indexed to inflation.

The third retirement system was established by the Military Retirement Reform Act of 1986 and is commonly referred to as the REDUX Plan. The REDUX plan changed the annuity formula to $((0.40 + 0.035 * (\text{years of service} - 20)) * \text{high-3 average basic pay})$ for years between separation and age 62. At age 62, the annuity formula reverts to the FY 1981-1986 formula. Consequently, at retirement a 20-retiree will receive 40% of his high-3 average basic pay and a 30-year retiree will receive 75% of his high-3 average basic pay. In addition, cost of living adjustments between separation and age 62 are 1 percent less than the percentage growth in the consumer price index. At age 62, retired pay will be fully adjusted to inflation.⁸¹

The final component of the military compensation system is non-pecuniary benefits or payment received in kind. The military provides family health and dental care. In addition, military members are able to use the commissary in order to shop for food at subsidized prices and can even play golf at Department of Defense golf courses at reduced rates.

G. EVALUATION

The Navy currently uses a behaviorally anchored rating scale (BARS) with a forced distribution for appraisal of its officers. BARS is a combination of the behavioral incident appraisal method and the rating scale appraisal method. In this method, performance is rated on a scale, but the scale points are anchored with behavioral incidents.⁸² The officer fitness report appraises an officer's professional expertise, adherence to equal opportunity, military bearing/character, teamwork, mission accomplishment and initiative, leadership, and tactical performance.

H. TRANSITIONING AND FORCE SHAPING

Transitioning or separation in the Navy with the exception of High Year Tenure (HYT) is typically voluntary. Officers are usually commissioned for an indefinite period of time. Initially, most officers are obligated for a certain time span in return for education or training.

⁸¹ Asch and Warner, pp. 6-7.

⁸² Muchinsky, pp. 229-230.

After that obligation often referred to as the minimum service obligation, the officers is free to resign his commission. About two- thirds of officers chose to leave the service at this point. Officers who chose to stay past the minimum service obligation are encouraged to stay until they fail to promote. As discussed in the promotion section, officers who fail to select to the next rank after two opportunities may be involuntarily separated at certain years of service due to the HYT rule.

Due to the military drawdown in recent years, the Navy, in addition to HYT, has had to use other tools to transition officers out of the Navy. The most popular of these tools has been Temporary Early Retirement Authority (TERA). TERA, which is voluntary, allows twice passed over O-4s retirement before 20 years of service. Another tool that the Navy has used is Selective Early Retirement (SER) for senior O-5s and O-6s. Unlike TERA, SER is involuntary and has been effective at inducing people to voluntarily separate when threatened with SER. The last tool is Voluntary Separation Incentive/ Special Separation Benefit (VSI/SSB) which is basically a separation bonus given to personnel at the mid-career point to give them the incentive to leave without retirement benefits. VSI/SSB was mostly used for enlisted personnel, but was briefly used for officers in the early 1990s. Like TERA, VSI/SSB was voluntary.⁸³

⁸³ Thie and Brown, pp. 284-285.

VL THE EXTERNAL ENVIRONMENT IN 2020

A. OVERVIEW

In Chapters III, IV, and V, we gained a firm grasp on the present. Now, it is time to look to the future. According to Colin Gray, any look at the future of warfare has to look at three areas or as he calls it "clusters of trends."⁸⁴ The first area is the **international environment** addressing the questions of **who**, **where**, and to some degree **how** we will fight. The second area pertains to the **domestic environment** and addresses the questions of **when** we will fight and **what for**. The third and final area is technical and relates to **the Navy** in particular. This area attempts to complete the answer on **how** we will fight, and will be discussed in Chapter VII. This chapter along with Chapter VII will lay the foundation for subsequent discussions of the naval officer of 2020 in Chapters VIII, IX, and X.

B. THE FUTURE INTERNATIONAL ENVIRONMENT

When looking at the future of war, it is useful to recall what Carl Von Clausewitz stated in *On War* during the first half of the nineteenth century that "war is a mere continuation of policy by other means." He describes war as "not merely a political act, but also a real political instrument."⁸⁵ In this context any discussion of the future of warfare needs to start with the political climate or more correctly the international or external environment that would lead to war being used as a political instrument by or against the United States. It is this external environment that will dictate the nature and character of any future conflict, and it will determine who, where, and to some degree how the United States will fight its next war.

The future is at best uncertain, and any accurate prediction of society as a whole is inherently impossible. The best practice for overcoming this uncertainty is to consider an

⁸⁴ Colin S. Gray, "The Changing Nature of Warfare," *The Naval War College Review*, (Spring 1996), p. 12.

⁸⁵ Carl Von Clausewitz, *On War*, edited by Anatol Rapoport, (Penguin Books: London, England, 1968), p. 119.

appropriate set of futures or contingencies.⁸⁶ From these contingencies or scenarios, we can make an educated guess as to the true course of events. The National Defense Panel applied this concept and in their study of long term issues facing U.S. defense and national security, analyzed four alternative scenarios in order "to appreciate the range of security considerations in 2010-2020."⁸⁷

The panel's framework is used in this chapter to describe the scenarios that could lead to a future war that would involve the United States. In addition, recent literature as it pertains to the future of war within this analytical framework will be summarized. All four climates are feasible, and at the same time it is entirely possible that a totally different type of external environment will develop. However, the majority of the scenarios envision a world that has fundamentally changed as compared to the relative stability of the cold war with the Soviet Union. The Commander in Chief of the Atlantic Fleet, Admiral J.P. Reason calls this new age the "Trans-Industrial Age." Others have named it the "new age," the "post-industrial age," the "information age," the "third wave," and the "knowledge age."⁸⁸ Regardless of the name, however, most of the visions describe the future and the near future as a period of uncertainty, and complex, dynamic change.

1. A World of Shaped Stability

The NDP's first scenario, a world of shaped stability, is the only scenario that envisions a world that is not challenged by widespread uncertainty. It describes a world in which international cooperation on economic development and security issues have created a relatively stable international order. The scourge of terrorism, organized crime, and environmental degradation have created broad public support for cooperative security arrangements. There is friction in this world in the guise of demographic pressures, shortages of national resources, proliferation of weapons of mass destruction, and continuing ethnic and nationalistic tensions, but through the cooperation of law enforcement, the intelligence

⁸⁶ Edward S. Quade, *Analysis for Public Decisions*, 3d ed. revised by Grace M. Carter, (Prentice Hall: Englewood Cliffs, NJ, 1989), pp. 354-355.

⁸⁷ National Defense Panel, p.8.

⁸⁸ J. Paul Reason, *Newport Paper: Sailing New Seas*, (Naval War College, Newport, RI, 1998), p. 1.

communities, the military, and various national and international agencies, the rule of law is increasingly accepted. The primary role of the military in this climate is the augmentation of diplomatic, economic, and political efforts to maintain the stable international order.⁸⁹

There are few who see this scenario as likely to occur. However, there are two recent books that predict this future external environment, Bevin Alexander's *The Future of Warfare* and George and Meredith Friedman's *The Future of War: Power, Technology and American World Dominance in the Twenty-First Century*. These authors contend that the twenty-first century will be the American Epoch whereby the technological superiority of the United States will give it a prominent role in shaping a stable international community.

Alexander maintains that the only major threats to the United States are (1) attempts by one or more powers to seize vital industrial commodities like oil, and (2) attempts by some power to gain hegemony or dominance in Eurasia. He maintains that the likelihood of success of either of these scenarios is unlikely due to the prohibitive expense of an arms race with the United States. According to Alexander, the only likely combat scenario for the U.S. Military is low intensity conflict in the form of regional wars fought to counter aggression of minor powers and guerilla wars. He believes that the United States will be able to win low intensity conflicts to counter aggression, but that guerilla wars will continue to pose a serious challenge to the military, but will not pose a serious challenge to the United States' role in the international community. He goes on saying that the "U.S. Military must prepare for any contingency. This means that the military must have a ready basket or 'toolbox' of flexible, general purpose forces and weapons with the capability of responding to a number of challenges and performing a range of operations it might be called on to undertake- even though Americans are likely to fight low intensity wars mainly against guerillas or semi-guerillas."⁹⁰

The Friedman's support the idea of the American Epoch for similar, but not entirely for the same reasons. Like Alexander, the Friedman's argue that technology gives the combat edge

⁸⁹ National Defense Panel, p.8.

⁹⁰ Bevin Alexander, *The Future of Warfare*, (W.W. Norton and Company: New York, 1995), pp. 15-16, 35, 45-47, 51.

to United States forces, but the Friedman's argue that space is the frontier from which the United States will dominate the international scene. Their logic is as follows:

"Whoever controls space, therefore, will control the world's oceans. Whoever controls the oceans will control the patterns of global commerce. Whoever controls the patterns of global commerce will be the wealthiest power in the world. Whoever is the wealthiest power in the world will be able to control space."⁹¹

The arguments of the Friedmans to some extent resemble the arguments of Alfred Thayer Mahan at the beginning of this century.⁹² The primary difference being that the Friedmans replace control of the ocean with control of space. Unlike Alexander, the Friedman's do not see guerilla warfare as a significant challenge to the U.S. Military. The Friedman's argue that hypersonic precision guided missiles are the biggest threat to U.S. Military power in the form of denied sea control. It is only through the control of space and the subsequent elimination of an enemy's over the horizon targeting capability that this threat can be countered.

2. Competition for Leadership

The second political climate is the traditional balance of power world in which a hostile regional alliance is rising to challenge the interests of the United States. The United States forms alliances and security relationships to counter the challenge. Military spending is increased worldwide and regional arms races develop. Ethnic and humanitarian tensions still exist, but they are dwarfed by the bipolar competition. The possibility of major combat operations dominates the planning of the armed services as the military must position itself to defend the homeland in the guise of weapons of mass destruction or information systems disruption.

⁹¹ George and Meredith Friedman, *The Future of War*, (St. Martin's Griffin: New York, 1996), p. 411.

⁹² Alfred Thayer Mahan argues in his first two books that the 'maritime predominance of Great Britain' was the deciding factor in Great Britain's defeat of the French, Spanish, and Dutch in the wars of the 17th, 18th, and 19th centuries, and that Great Britain obtained this 'maritime predominance' through naval command of the sea and the combination of maritime commerce, overseas possessions, and privileged access to foreign markets that produces national 'wealth and greatness.' Philip A. Crowl, "Alfred Thayer Mahan: The Naval Historian," *Makers of Modern Strategy: from Machiavelli to the Nuclear Age*, edited by Peter Paret, (Princeton University Press, Princeton, NJ, 1986), pp. 450-452.

The QDR classified this possibility as a wildcard scenario with little likelihood of happening before 2015. Very few scholars think that this is a likely scenario for the future. On the other hand, the QDR did mention it as a possible scenario for the time period after 2015 where a growing China or a resurgent Russia could threaten the interest of the United States. Richard Bernstein and Ross H. Munro in *The Coming Conflict with China* depict military hostilities between the China and the United States as likely if the United States remains naive and China aggressively seeks hegemony of Eurasia. These authors base their conclusion on two propositions: (1) that "after floundering for more than a century, [China] is now taking up the great power role that it believes, with good reason, to be its historical legacy," and (2) within a few years, China will be the largest economy in the world and will become a formidable military power.⁹³ This is unlikely in the near term, but in the long term, it can not be ignored as a possibility.

3. Extrapolation of Today

The third potential external environment scenario of 2020 is a "baseline projection of today's uncertainties into an increasingly competitive and politically diverse world."⁹⁴ The Pacific Rim economic expansion has made China and maybe even India a key player on the world stage. Rogue states and non-state actors have acquired the means of delivering weapons of mass destruction, and the American homeland cannot be viewed as immune to their threat. Consequently, the United States role as the world's leading power is tenuous and uncertain.

The defense community predicts the future will be like this climate. The Quadrennial Defense Review of 1997 (QDR) maintains that "it is reasonable to assume that more than one aspiring regional power will have both the desire and the means to challenge U.S. interests militarily."⁹⁵ It argues that North Korea, Iraq, or Iran will pose threats to either their neighbors or threats to the flow of trade. In addition, the QDR maintains that the U.S. homeland is not immune to asymmetric means of attack from national and transnational organizations such as

⁹³ Richard Bernstein and Ross H. Munro, *The Coming Conflict with China*, (Random House: New York New York, 1997), pp. 3-4.

⁹⁴ National Defense Panel, pp. 8-9.

⁹⁵ *Report of the Quadrennial Defense Review*, p. 2-1.

terrorists, drug cartels, and international organized crime. Finally, it states that there is a significant possibility of emerging regional powers in the guise of China and a resurgent Russia even as early as 2015.⁹⁶ The Navy's role in this future is guided by its current naval strategic document series, *Forward...From the Sea*. The Navy sees its future in the littoral environment seeing combat in regional conflicts and being used as a crisis response force.⁹⁷

The Naval Studies Board of the National Research Council in its series, *Technology for the United States Navy and Marine Corps 2000-2035: Becoming a 21st Century Force*, concurred with the QDR's assessment of the future political climate. It concluded that potentially hostile regional powers in the Mediterranean, the Middle East, and the Far East pose a threat to United States interests. In addition, the Naval Studies board mentioned the growing threat from transnational organizations, but in the end assessment the Naval Studies Board emphasized the threat of the regional powers.⁹⁸

Samuel Huntington has refined the extrapolation of today's political climate in *The Clash of Civilizations: Remaking of World Order*. He argues that there are nine civilizations in today's world and that these nine civilizations will dominate the international political scene in the future. He contends that nation-states "are and will remain the most important actors in world affairs, but their interests, associations, and conflicts" will be increasingly shaped by cultural and civilizational factors."⁹⁹ Transnational organizations will pose dangers to the world, but the stability of the world will depend upon the interaction of the states or groups from different civilizations.

Huntington states that there are three types of wars today and in the future: core state conflicts, fault line wars, and transition wars. Core state conflicts are wars that result from changes in the global balance of power among civilizations. The participants in a core state conflict are typically the major nations of their respective civilization. According to Huntington,

⁹⁶ Ibid., pp. 2-1 - 2-2.

⁹⁷ *Forward...From the Sea*, 5-7.

⁹⁸ Naval Studies of the National Research Council, *Technology for the United States Navy and Marine Corps, 2000-2035: Becoming a 21st Century Force*, Volume 1 Overview, (National Academy Press: Washington, D.C., 1997), pp. 30-34.

the major threat of a core state war in the future comes from the emergence of China as a dominant power. Fault line wars occur between neighboring states of different civilizations as each civilization vies for its role as the dominant civilization. Huntington claims that fault line wars will be prevalent in the future especially between Muslim and non-Muslim civilizations. The last category, transition war, is a war that bridges the gap between wars of the industrial age and the new clash of civilizations. Both the Soviet War in Afghanistan and the Persian Gulf War according to Huntington were transition wars. They both started off as relatively simple wars of aggression, but they developed into wars upon which civilizations clashed and the new world order asserted itself. The role of the United States in this new world order is at best uncertain.¹⁰⁰

4. Chronic Crisis

The fourth and final scenario is a world that has deteriorated into chaos. Economic conditions along with the breakdown of international institutions have created a condition whereby weakened nation-states, non-state actors, and coalitions fight over scarce resources. Nationalism and ethnic hatred permeate the world. Virtual narco-states exist in regions in Asia and South America and weapons of mass destruction are widely available. Urban chaos dominates the world as the United States has lost a great deal of its will to influence world events. The American public is focused on domestic issues and domestic security as non-state actors increasingly penetrate and target the United States.¹⁰¹

Martin Van Creveld in *The Transformation of War* argues that the "state's attempt to monopolize violence in its own hands is faltering." He believes that "the rise of low intensity conflict may, unless it can be quickly contained, end up destroying the state." Unlike the three other scenarios, Van Creveld argues that the transnational organizations will take over and dominate war in the future because nation-states are failing in their ability to protect their people from the violence of transnational organizations. In this scenario, combatants become

⁹⁹ Samuel P. Huntington, *The Clash of Civilizations: Remaking World Order*, (Touchstone: New York, New York, 1997), p. 36.

¹⁰⁰ *Ibid.*, pp. 207-249.

¹⁰¹ National Defense Panel, pp. 9-10.

intermingled with noncombatants to avoid the threat of modern weapons such as missiles and nuclear weapons. This intermingling, Van Creveld maintains, will render modern large technologically advanced weapons such as aircraft, ships, and tanks useless. As such, combat will resemble the struggles of primitive tribes rather than the high tech warfare envisioned by the military-industrial complex of the United States. "Weapons will become less, rather than more sophisticated," and "the troops may well have more in common with policemen (or with pirates) than with defense analysts."¹⁰²

Two recent books have supported Van Creveld's view of the future political climate. The first is Robert Kaplan's *The Ends of the Earth: A Journey to the Frontiers of Anarchy*. In it, Kaplan describes his journeys in West Africa and Southeast Asia through the remains of disintegrating nation-states. He indicates that of the eighty wars since 1945 only 28 have been fought by the regular armies of two or more nation states. Civil wars and guerilla war accounted for 46 of these wars. Kaplan argues that overpopulation, ethnic rivalry, environmental degradation and host of other factors have contributed to the blurring of national borders and have shrunk the world to such a large degree that the United States and the rest of the world will have no choice but to get involved.¹⁰³ Gary Hart in *The Minuteman: Restoring an Army of the People* takes Kaplan's observations one step farther and agrees with Van Creveld that "the twenty-first century is going to look a lot less like the twentieth-century Great Power chess games and a lot more like the fourth- and fifth- century chaos of decaying empires."¹⁰⁴

The National Defense Panel analyzed four different scenarios in order to appreciate the full range of possibilities of future conflict in which the United States could be involved. The climates in the NDP study covers most of today's theories on the future of war. Almost all military futurists believe that we are in a time of significant change and that the military will have to be responsive to that change. Michael Wyly in his article "Combat in the 21st Century"

¹⁰² Martin Van Creveld, *The Transformation of War*, (The Free Press, New York, New York, 1991), pp. 192-212

¹⁰³ Robert D. Kaplan, *The Ends of the Earth: A Journey to the Frontiers of Anarchy*, (Random House, New York, New York, 1996), pp. 8-9.

¹⁰⁴ Gary Hart, *The Minuteman: Restoring an Army of the People*, (The Free Press: New York, New York, 1998), p. 28.

depicts the debate as a battle between dichotomous perspectives. On the one side, Technological Superiorists believe that American technical prowess will make the difference. On the other side is the Mental Agility Theorists who believe that technical superiority will mean little as our transnational enemies fight the United States with asymmetric means.¹⁰⁵ The true course is difficult to discern, but to some degree probably both sides are right. The rise of transnational actors and non-government organizations has greatly complicated the external environment of the United States. At the same time, technological advances that will be discussed later in this chapter have greatly increased both the lethality of force and the agility of force. The real question is can the Navy and the United States military adapt its technology and organization to confront the challenges posed by both governmental and non-governmental organizations with internet technology and networked hierarchies.

C. THE FUTURE DOMESTIC ENVIRONMENT AS IT PERTAINS TO WAR

In *On War*, Clausewitz described the nature of war as a

"wonderful trinity, composed of the original violence of its elements, hatred and animosity, which may be looked upon as blind instinct; of the play of probabilities and chance, which make it a free activity of the soul; and of the subordinate nature of a political instrument, by which it belongs purely to reason. The first of these three phases concerns more the people; the second, more the General and his Army; the third, more the Government."¹⁰⁶

In the previous section, I discussed the nature of war as a political instrument and thus the domain of the government. This section will briefly discuss the nature of war with regards to the people. It is within this arena that we look for the answer to the questions of when and for what the United States will fight. Military Historian Michael Howard called the social dimension one of "the forgotten dimensions of strategy."¹⁰⁷ He is correct in asserting that domestic politics and the American Society are prominent factors in determining the nature of future war.

¹⁰⁵ Michael D. Wyly, "Combat in the 21st Century," *U.S. News and World Report*, (16 March 1998).

¹⁰⁶ Clausewitz, p. 121.

There are 4 major ways in which domestic politics and society have a significant impact on security policy and the military. The first is purely budgetary. Relative to the early 1980s, the Defense Department has been under tight budget constraints in recent years. The United States gets the best defense that it can afford. Both the QDR and the Defense Reform Initiative call for a revolution in business affairs so that the military can spend more of its money on weapons and operations and less on infrastructure. Outsourcing has been the component of this initiative that has received the most attention. The effects of these changes in practices are not yet clear nor is their impact on both the security of the United States and the military clear.

The second way that domestic politics and society effect security policy and the military is through political decisions to be involved in international affairs. A stated assumption of the QDR was that the United States would remain engaged in the world over the next 15 to 20 years.¹⁰⁸ This engagement has not always been the policy of the United States. For a large part of our history, the United States has held itself relatively aloof from world affairs. With the end of the cold war, the isolationist argument has resurfaced. During the cold war, our moral and material interests converged. This is no longer the case.¹⁰⁹ The reality is that during the 1990's material concerns seemed to outweigh our isolationist tendencies while our moral interests lay relatively dormant. This is a precarious "roost" from which to manage foreign and security policy. However, there is little indication that anything will change. There has been little domestic debate over the role of the United States in the world and the material interests of the United States will most likely dominate American Policy in the future.

Third, the demographics of the United States are shifting. Non-white sections of the United States populace are growing. See Table 6-1. There is potential for this change in demographics to shift the focus of United States foreign policy away from "Eurocentric" focus of today to either an Asian focus or even a focus on Africa. Racial/ethnic minorities in the United States to varying degrees seem to identify with the country of their origin regardless of

¹⁰⁷ Michael Howard, "The Forgotten Dimensions of Strategy," *Foreign Affairs*, (Summer 1979), pp. 975-986, as quoted in Colin S. Gray, "The Changing Nature of Warfare," *The Naval War College Review*, (Spring 1996), p. 10.

¹⁰⁸ Report of the Quadrennial Defense Review, pp. II-2.

¹⁰⁹ Richard K. Betts, "Power, Prospects, and Priorities," *The Naval War College Review*, (Winter 1997), p. 11.

how much time or how many generations have past. As the demographics shift, we could see our nations focus shift with it.¹¹⁰

U.S. Demographic Trends

Racial/Ethnic Group	1998	2000	2025
White	72.5	71.8	62.4
African American	12.1	12.2	13.0
Hispanic	11.0	11.4	17.6
Native/Asian American	4.4	4.6	7.0

Table 6-1 United States Demographic Trends (Source: U.S. Bureau of the Census, Current Population Reports, Series P25-1130, "Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050.")

The fourth and final effect of domestic politics and society's effect on security policy and the military is the civilian societies view or perception of the military. The military to be effective needs to have credibility in the eyes of the people it is sworn to protect. The Navy needs to be able to recruit from the populace, acquire resources from the populace, and the Navy needs to maintain the morale of its people which is at least to some degree dependent on how the nation perceives its troops. To maintain credibility, the military has to reflect society in demographics and to certain degrees in social values. The American populace since the founding of our nation has been fearful of standing armies. We can not afford to play into their fears. We need to look like our populace and we need to be like our populace.

¹¹⁰ Both Cuban and Jewish immigrants have at least appeared to shape United States foreign policy with the country of their origin. For Jewish Americans, it is the United States firm support for state of Israel. For Cuban Americans, it is the U.S. embargo of Cuba.

VII. THE FUTURE UNITED STATES NAVY

A. OVERVIEW

The final part of Clausewitz's trinity, that was introduced in the last chapter, is the general and his army. In the context of this thesis, it is probably more accurate to say the admiral and his navy. We looked, in the previous chapter, at the international/external and the domestic/internal environment of the future. In this chapter, we will look at the means of future naval warfare. As can be discerned from the environment as described by the previous chapter, we are most likely entering a time of extreme uncertainty and dynamic complex change. This environment is going to place great strains on the military to adapt. As Admiral Gehman, Commander in Chief (CINC) of United States Atlantic Command, intimated in a speech to the Atlantic Council, non-governmental actors and terrorists have very flat and fluid organizations. The United States military will have to adopt similar flat and fluid organizational designs to be able to adapt and defeat these forces.¹¹¹

The Navy needs to transform itself from the Directive Configuration/Machine Bureaucracy into the Generative Configuration that was introduced in Chapter II. This is the only way that our Navy is going to gain the agility and speed necessary to be effective against non-governmental organizations and transnational actors in the dynamic and uncertain future. While we must be effective, the Navy must also be efficient due to the scarcity of government funds to pay for defense. To be effective and efficient, we must be collaborative to be successful and that means we need to change all the design functions of the Navy from tasks to technology to structure to people to processes. All need to be changed and all need to be congruent with each other and the Navy's new direction. Currently, the Navy is moving in this general direction with the revolution in military affairs and network centric warfare, albeit slowly and haphazardly. This chapter will discuss the RMA as it gives insight into what the

¹¹¹ Admiral Gehman, CINC USACOM, Speech to the Atlantic Council, Norfolk, VA, 24 August 1998.

tasks, technology, and structure of the Navy will be like in the future. In addition, the fleet of 2020 will be briefly discussed.

B. THE REVOLUTION IN MILITARY AFFAIRS

There is a growing consensus that we are in the midst of a revolution in military affairs (RMA). The professional journals of the defense establishment are dominated by articles singing the praises or sounding the warnings of this RMA. A revolution in military affairs is a "fundamental shift in military strategy, doctrine, and tactics that occurs generally-- but not always-- due to a change in technology."¹¹² An RMA is comprised of four elements: technological change, systems development, operational innovation, and organizational adaptation.¹¹³ Past RMAs have included the introduction of gunpowder, submarine warfare, and nuclear weapons. For a more complete list of potential past RMAs see Table 7-1.

The current RMA has three primary components. The first major component is what former Secretary of Defense William Perry has coined the "systems of systems."¹¹⁴ The "systems of systems" is shorthand for a collective synergy achieved by the melding of formerly disparate means to establish battlespace awareness, command and control, and precision force. The second major component of the RMA is information dominance which is the ability to control the flow of data on the increasingly interdependent global information network. The third major component of the RMA is the corollary to the second, information warfare. Information warfare is the capability to disrupt or override enemy information systems while defending our own information systems.¹¹⁵

¹¹² James J. Tritten, *"Revolutions in Military Affairs," Paradigm Shifts, and Doctrine*, (Naval Doctrine Command: Norfolk, VA, 1995), p. 1.

¹¹³ Jeffrey A. Harley, "Information, Technology, and the Center of Gravity," *Naval War College Review*, (Winter 1997), p. 71.

¹¹⁴ William J. Perry, "Military Action: When to Use It and How to Ensure Its Effectiveness," in Janne E. Nolan, ed. *Global Engagement: Cooperation and Security in the 21st Century*, (The Brookings Institution: Washington, D.C., 1994), p. 240, as quoted in James R. Blaker, *Understanding The Revolution in Military Affairs: A Guide to America's 21st Century Defense*, (Progressive Policy Institute: Washington, D.C., 1997), p. 5.

¹¹⁵ James Stavridis, "The Second Revolution," *Joint Forces Quarterly*, (Spring 1997), p. 9.

The "system of systems" component of the RMA has received the most attention, and it revolves around three advances: (1) advances in the gathering of intelligence, (2) advances in

Possible RMAs of the Past

14th Century

- longbow: cultural

15th Century

- gunpowder: technological, financial

16th Century

- fortifications: architectural, financial

17th Century

- Dutch - Swedish tactical reforms: tactical, organizational, cultural
- French military reforms: tactical, organizational, administrative

17th - 18th Centuries

- naval warfare: administrative, social, financial, technological

18th Century

- British financial revolution: financial, organizational, conceptual
- French Revolution: ideological, social

18th - 19th Centuries

- industrial revolution: financial, technological, organizational, cultural

19th Century

- American Civil War: ideological, technological, administrative, operational

late 19th Century

- naval warfare: technological, organizational

19th - 20th Centuries

- medical: technological, organizational

20th Century

- World War I: combined arms: tactical, conceptual, technological, scientific
- Blitzkrieg: tactical, operational, conceptual, organizational
- carrier war: conceptual, technological, operational
- strategic air war: technological, conceptual, tactical, scientific
- submarine war: technological, scientific, tactical
- amphibious war: conceptual, political, ideological
- intelligence: conceptual, political, ideological
- nuclear weapons: technological
- people's war: ideological, political, conceptual

Table 7-1. Possible RMAs of the Past (Source: Williamson Murray, "Thinking About Revolutions in Military Affairs," *Joint Forces Quarterly*, Summer 1997, 70.)

the processing and distribution of intelligence, and (3) advances in precision guided munitions.¹¹⁶ Advances in the gathering of intelligence include what Admiral William Owens (ret) calls ISR systems (Intelligence, Surveillance, and Reconnaissance).¹¹⁷ These systems include satellites that cover the electromagnetic spectrum, unmanned aerial and undersea vehicles, Aegis radars, and JSTARS aircraft (Joint Surveillance and Target Attack radar System). Second, advances in processing and distributing of information have evolved under the umbrella of C4 systems (Command, Control, Communication, Computer systems). These systems include today's Global Command and Control System and the Navy's Cooperative Engagement Capability and are the means in which the sensor and the shooter are closely linked. The third advance is in long range precision guided munitions (PGM) involving weapons like the Tomahawk missile, the Maverick missile, and the Joint Direct Attack Munition (JDAM). PGMs give the military the ability to successfully attack targets with fewer rounds while at the same time minimizing collateral damage.

Any one of these advances, by itself, does not constitute a revolution. It is the synergy of these systems that represents the quantum jump in lethality. For in this synergy, the military has dominate battlespace knowledge (the knowledge of what and where things are), near perfect mission assignment (the ability to apply the right kind of force at the right time against the right targets), and near perfect battle assessment (the capacity to know almost immediately the results of military operations).¹¹⁸ For the Navy, this means that we have the ability for the simultaneous massing of dispersed fires on common targets, geographic dispersal for improved own force protection, and perhaps most importantly a tremendous increase in the tempo of operations.¹¹⁹ The increase in operations tempo will be the result of self-synchronization. Self-synchronization is the mutual adjustment of the operating core through collaboration vice the traditional hierarchical chain of command method of the past. **With the chain of command decentralized and flattened, officers at the lower levels empowered with the knowledge**

¹¹⁶ "The Future of Warfare," *The Economist*, (January 1997), p. 21

¹¹⁷ Blaker, p. 7.

¹¹⁸ *Ibid.*, pp. 9-10.

gained by the new sensors and the new information backplane, connected in a networked, near boundaryless, virtual organization, can make decisions on the spot without the need to consult higher authority on a regular basis for the purpose of integrating effort. Figure 7-1 graphically displays the RMA "system of systems" argument. It is this increased operation tempo which proponents of the RMA contend will "usher in an era of conflict based on paralysis and shock rather than attrition."¹²⁰ For the goal is, as Vice Admiral Arthur Cebrowski states, to "lock-out" the enemy's alternatives and thus "lock-in" success.¹²¹

Extended information dominance through the ability to control the flow of data is a major component of the RMA that many confuse with the "system of systems" component. It is a separate component because it allows us to provide information instead of military capital stocks and troops. This will allow the United States to better execute alliance obligations, undertake stand-off operations, and realize greater combat efficiencies. Information dominance in this context becomes a commodity that we can give our allies so that they can leverage their systems more effectively while our forces remain relatively safe.¹²² This harkens back to the days of the Ancien Regime when the British Empire used their financial strength instead of military troops to support Prussian military operations on the European continent.

Information warfare, also referred to as hacker warfare, command and control warfare or cyber warfare, deals with the attack on and the defense of information systems and is the third major component of the current RMA.¹²³ The Joint Chiefs of Staff have determined that information warfare or Command and Control Warfare consists of five elements: destruction of information systems, deception, electronic warfare, psychological operations, and operational security.¹²⁴ In the past year, this new type of warfare has received a good deal of attention as

¹¹⁹ James R. FitzSimonds, "The Cultural Challenge of Information Technology," *The Naval War College Review*, (Summer 1998), p. 1.

¹²⁰ Thomas G. Mahnken, "War in the Information Age," *Joint Forces Quarterly*, (Winter 1995-96), p. 40.

¹²¹ Arthur K. Cebrowski and John J. Gartska, Network Centric Warfare: Its Origin and Future," *United States Naval Institute Proceedings*, (January 1998), p. 32.

¹²² Stavridis, pp. 9-10.

¹²³ Ibid., p. 10.

¹²⁴ Harley, p. 68.

Pentagon computer systems have been under attack by computer hackers from different parts of the world. The importance of this new area can not be overestimated as every sector of society grows more and more dependent on information systems ranging from banking ATMs to communications to the internet.

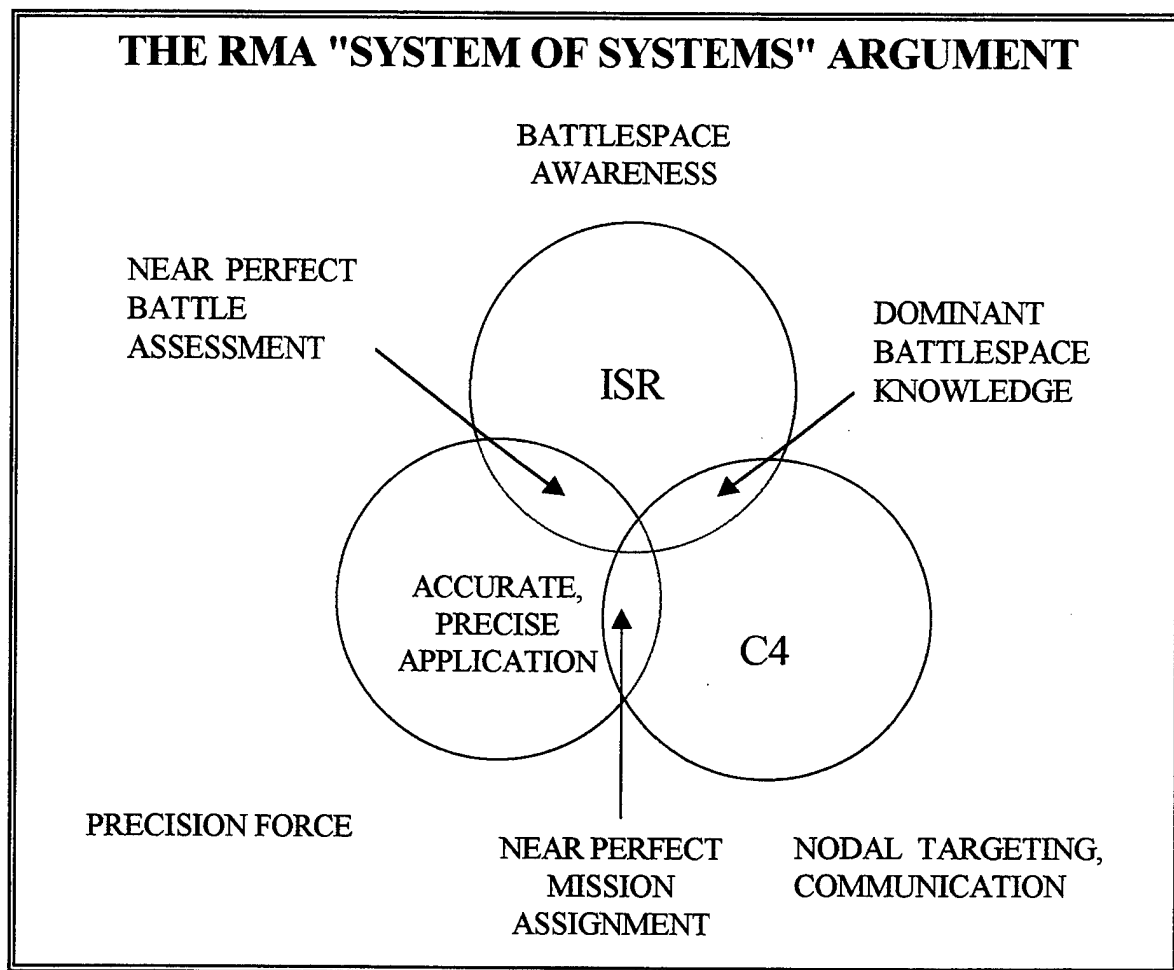


Figure 7-1. The RMA "System of Systems" Argument (James R. Blaker, *Understanding The Revolution in Military Affairs: A Guide to America's 21st Century Defense*, Progressive Policy Institute, 1997)

One of the unmistakable characteristics of a revolution in military affairs is that they take years to develop. The consensus for the current RMA is that it is still in the early stages. The technology and the systems are here and to some degree have been here since before the end of the cold war. There can be no doubt that the technology will change and change rapidly,

but for this RMA, like the RMAs in the past, operational innovation has been slow and organizational adaptation has lagged even farther behind.¹²⁵ Arguably the RMA will have the greatest potential impact in these areas.

There are two schools of thought on the effect of the RMA on operations and the organization. The majority opinion described by Admiral Reason, Vice Admiral Cebrowski and many others is that as previously discussed, the RMA network in the guise of C4 systems will bring a flattened and decentralized organization whereby the lower echelons will "self-synchronize" their efforts through massive amounts of lateral communication in a networked virtual organization. An example of this change in its infancy occurred when an single aircraft carrier in the western Pacific in early 1997 sent 54,000 e-mails in one month. This constituted about half the amount of all message traffic in the entire Western Pacific at that time.¹²⁶ The argument of this school is that the Navy and the military will become more responsive and thus operationally agile and thus be more capable of overcoming the uncertainty and complexity of future combat.

The opposing school of thought believes that the RMA will indeed flatten the organization, but at the same time the organization will be highly centralized vice decentralized. Members of this school argue that "there is no reason to expect that they [commanders] will be able or willing to avoid involving themselves in actions taken by their subordinates, of whose circumstances they will believe they have full knowledge...Moreover, future knowledge-empowered commanders are likely to find it ethically unacceptable to absolve themselves of accountability for lower-level actions of which they have full knowledge and control, and for which they are ultimately responsible." Indeed this trend has been seen in several exercises. In a 1995 Joint Staff sponsored war game, a centralized theater commander saw his resource deficiency as so acute that he assumed the authority to determine when his subordinate ship commanders could fire long-range surface-to-air missiles in self-defense. One Aegis

¹²⁵ Harley, p. 71. and Reason, p. 2-30.

¹²⁶ Cebrowski, p. 33.

commanding officer openly threatened to withdraw his unit from the theater-wide defense network if his prerogative to fire in self-defense were taken away.¹²⁷

It is still unclear exactly which school will dominate in the next fleet. The pull to centralize is very tempting especially with technology giving commanders more and more knowledge of the battlefield. In reality however, the evidence shows that centralized control works poorly in times of rapid change because no expert can know it all. As Admiral Reason states in *Sailing New Seas*, "the smells, the tensions, the noises, the pulse, the feel, the events unconsciously seen and recorded peripherally- all these cannot be verbalized or digitized, transmitted, and reconstituted accurately, completely, and quick enough...Areas of expertise, responsibility, and authority must be kept to a level to which the expert can be trained and within which the expert can be fully aware of all important, relevant information."¹²⁸

B. THE FLEET OF 2020

As stated by Admiral Reason in *Sailing New Seas*, it must be assumed that the next Navy and the Navy after next will still be composed of ships, submarines, and aircraft, but perhaps not exclusively.¹²⁹ This seems to be a relatively safe assumption, and as such we need to analyze the technological trends for these platforms.

1. Surface Ships and Submarines

According to current plans, the composition of the surface force and submarine force of 2020 will be similar to the one of today. The Navy will still be using *Nimitz* aircraft carriers, *Ticonderoga* Class Cruisers, *Arleigh Burke* Destroyers, *Wasp* Class Amphibious Assault Ships, *San Antonio* Class Amphibious Transport Docks, *Los Angeles* Class Attack Submarines, *Seawolf* Attack Submarines, and *Ohio* Class Ballistic Missile Submarines. In addition the Navy is projected to have introduced by 2020 the DD-21 land attack destroyer, the CVX aircraft carrier, and the NSSN attack submarine.

¹²⁷ FitzSimonds, p. 4-10.

¹²⁸ Reason, pp. 5-6

¹²⁹ Reason, pp. 2-8.

The DD-21 land attack destroyer is currently set to replace the aging Spruance class of destroyers. The class is planned to consist of 32 ships with the lead ship launched in 2008. The ship as presently conceived will be minimally manned with a crew of 95 vice the current destroyer manning of 340. This reduced manning is to be accomplished through automation and control. The driving force behind reduced manning is the goal of reducing platform life cycle costs. The largest life-cycle cost of current platforms is the personnel that man them.¹³⁰ With automation, the Navy hopes to reduce watchstanding requirements, machine monitoring requirements and even casualty and damage control requirements. In addition to automation, current plans for DD-21 include using remote sensors in equipment to reduce or even eliminate the need for preventive maintenance. With current equipment, many man hours are used dismantling equipment on a periodic basis to ensure that it works on demand. With information technology, support functions will migrate off ship to be handled on shore. The amount of disbursing clerks, yeoman, etc on ships will be vastly reduced if not eliminated. All of these advances lead to minimally manned ships. Other technological advances planned for DD-21 include stealth, a new electric drive propulsion system, potentially a new hull form, and the 155 mm vertical advanced gun system that can fire 100 miles at up to 12 rounds a minute.¹³¹

The CVX aircraft carrier as currently planned will use the same technology that is being developed for the DD-21. The first of the class is planned to join the fleet in 2013 with the second slated for somewhere between 2018 and 2023. It is planned to have a crew size of about a 1000 vice the almost 5000 that man today's carriers. It will be nuclear powered like the carriers of today but will have an as-yet-undeveloped electric propulsion system. In addition, it will have electro-magnetic catapults vice the manpower and maintenance intensive steam catapults that we have today. Unlike the DD-21 however, it

¹³⁰ VADM Daniel Oliver, Testimony before the House National Security Committee, 12 March 1998.

¹³¹ Naval Studies Board of the National Research Council, *Technology for the United States Navy and Marine Corps, 2000-2035*, Volume 6, (National Academy Press: Washington, D.C., 1997), pp. 13-36, and "The Next Destroyer: Reinventing Surface Warfare," *The Navy Times*, (April 20, 1998), pp. 12-15.

will not have a new hull design until either the second or third ship of the class. The lead ship will be fitted with a *Nimitz* hull in order to save on development costs.¹³²

The NSSN is the planned replacement for much of the submarines of the *Los Angeles* class. It will realize much of the manpower savings of the DD-21 with regards to automation and lowered maintenance requirements. In addition, its modular design will allow it to be more flexible with regard to upgrading of systems. The objective of the NSSN program is "to produce a multi-mission, easy to upgrade submarine with the acoustic performance of the *Seawolf*, an acquisition cost equal to or lower than the cost of additional *Los Angeles* class submarines, and low life cycle costs. The lower life cycle costs are to be gained from reduced manning and an extended reactor core life time that will never require refueling."¹³³

Another trend in submarine warfare that is showing potential is unmanned underwater vehicles (UUV). UUVs show some significant promise in expanding the reach of traditional blue water submarines deep into the littoral environment. The missions that these UUVs could perform are numerous including mine warfare, antisubmarine warfare in particular anti-diesel warfare, and intelligence, surveillance, and reconnaissance missions. These vehicles have the potential of extending the operating range of submarines drastically.

2. Aircraft

Naval Aviation in 2020 under current plans will rely heavily on the F/A-18 E/F Super Hornet and the as-yet-developed Joint Strike Fighter. There is some interest in putting more emphasis on unmanned aerial vehicles and cruise missiles as seen by the findings of some recent CNO Strategic Studies Groups sessions, but this movement has not gained sufficient momentum to displace manned aircraft. The conventional wisdom is that of the

¹³² Naval Studies Board of the National Research Council, *Technology for the United States Navy and Marine Corps, 2000-2035*, Volume 6, (National Academy Press: Washington, D.C., 1997), pp. 13-36, and "Evolution of the Next Carrier," *The Navy Times*, (April 20, 1998), pp. 12-15.

¹³³ Naval Studies Board of the National Research Council, *Technology for the United States Navy and Marine Corps, 2000-2035*, Volume 6, (National Academy Press: Washington, D.C., 1997), pp. 85-111, Norman Friedman and Scott Truver, "It's What's Inside That Counts," *The United States Naval Institute Proceedings*, (February 1996), pp. 41-44, and William Kowenhoven and Frederic J. Harris, "The NSSN: A 21st Century Design," *The United States Naval Institute Proceedings*, (June 1997), pp. 35-38.

QDR which plans to procure a minimum of 548 Super Hornets. The total number of Super Hornets may be raised to 785 depending on the success of the Joint Strike Fighter which is being developed for the Air Force, the Navy, and the Marine Corps. Eventual procurement plans are for 2,852 Joint Strike fighters.¹³⁴ Tactical aviation procurement plans have been one of the most controversial DoD issue in recent years. It is hard to be certain of the direction that the Navy will actually take.

¹³⁴ Report of the Quadrennial Defense Review, p. VII-9.

VIII. THE IMPACT OF THE REVOLUTION ON TOMORROW'S NAVAL OFFICER

A. OVERVIEW

As seen through the lens opened in Chapters VI and VII, the environment of the naval officer is rapidly changing. In order to determine the impact of these changes on the naval officer of 2020, I conducted 23 interviews with senior military officers, civilian officials within the Department of the Navy, and academics at the Naval Postgraduate school. The eight major themes that emerged from these interviews are presented in Table 8-1. This chapter discusses each of the themes and provides supporting evidence in terms of excerpts and/or quotations from the interviews with these senior leaders.

Major Themes from Interviews

1. Theme I: The naval officer corps in 2020 will require more specialists and fewer but broader generalists/URL officers than those in service today.
2. Theme II: Information Technology is and is going to be a core competency for all Naval Officers.
3. Theme III: Naval Officers, even at the most junior level, will be required to be mentally agile and able to make quick decisions in a dynamic and uncertain environments.
4. Theme IV: Future Naval officers will have to be educated and trained in the joint arena to include coalition warfare at an early stage in their careers.
5. Theme V: Information technology and the potential reduction in crew sizes will change what it means to be an effective leader.
6. Theme VI: The officer of the future must be well-versed in building, participating, and leading multi-disciplinary teams.
7. Theme VII: Outsourcing will pose some difficulties for the officer corps of 2020.
8. Theme VIII: Demographic changes within the United States will be an opportunity for the Naval Officer of 2020.

Table 8-1. Interview Themes (Source: Author)

B. DATA COLLECTION, CONTENT ANALYSIS, AND THEME DEVELOPMENT

The 23 interviews were conducted at the Pentagon, at National Center 1 in Arlington, VA, and at the Naval Postgraduate School. The sample consisted of 15 active duty military officers ranging in rank from O-6 to O-10, 2 retired military officers (1 retired O-6 and 1 retired O-8), 2 senior level civilian Department of Navy officials, and 4 academics from the Naval Postgraduate School. There were 21 white males, 1 non-white male, and 1 white female. In addition, out of the 15 active duty military officers interviewed, 13 were naval officers, 1 was an army officer, and 1 was a marine corps officer. A standardized interview protocol was used and is shown in Table 8-2. The personal interviews were recorded on audiocassettes. The information was then transcribed, verbatim, for complete analysis. A list of interviewees is provided in Appendix C.

Interview Protocol Questions

1. What are going to be the most significant changes in what it means to an effective naval officer in 2020?
2. What skills/knowledge/abilities is the future naval officer going to need?
3. With regards to the future, will the navy need more specialists or more generalists?
4. With changes in technology comes changes in organization design. One of the touted advantages of network centric warfare is self-synchronization whereby the lower echelons communicate laterally to improve organizational effectiveness and speed of command. What impact will technology like network computing have on the naval organization of the future. Will it flatten our organization and what potential impact will that have on our officers?
5. Rightsizing and technology have led the navy into searching how to man ships and squadrons with less personnel. What impact if any will these smaller crew sizes have on future naval officers?
6. Outsourcing has been a hot item as of late. What will its impact be on the navy officer of 2020?
7. Population projections in the next century predict that there will be no majority in society. What does managing diversity mean for the naval officers of the future?
8. How do we get to the naval officer of 2020?
9. This completes my prepared questions, is there any area not covered by my questions that you think will be significant to the future naval officer?

Table 8-2. Interview Protocol (Source: Author)

The data were then organized by question. At this point, certain patterns emerged and common themes were developed from the responses. Themes obtained from the different questions were then compared and in several cases were merged into overarching themes. Techniques described by Patton (1990) provided guidance for the data collection, content analysis and theme development. These themes may be viewed as those reflective of the senior Navy leadership.

C. THEMES

1. Theme I: The naval officer corps in 2020 will require more specialists and fewer but broader generalists/URL officers than those in service today.

a. Theme

The Naval Unrestricted Line Officers of 2020 will need to be a well rounded generalist, or more accurately, he must be a specialist in warfare. However, the percentage of the officer corps that is in the URL will decrease as the Navy relies on more specialists to manage and develop the highly technical equipment of the Navy. Advances in information and other technologies will increasingly require uniformed experts to better understand, manage and adapt technology to the pursuit of war. A smaller cadre of generalists/specialist in warfare will be required to integrate the efforts of other specialists, and actually use the results of technology in armed conflict.

b. Justification

This theme emerged from of the responses to question 3 of Table 8-2 which asks whether the Navy will require more generalists or more specialists in the future. Half of the interviewees felt that the Navy needed more generalists in order to integrate force against the enemy, a quarter of the interviewees felt that the Navy needed more specialists due to the increasing demands of technology, while the remaining quarter felt that the Navy required more specialists to manage the advanced technology but at the same time required broader generalists to integrate the force. After a careful review of the interviewees' statements, it

became evident that the response to this question was dependent on the interviewees' perception of what a naval officer is. Those who equated the naval officer with the unrestricted line officer consistently sided with the generalist vision of a naval officer as evidenced by the following except.

"I honestly believe that line officers are by definition generalist officers. They have to be. Officers of the line, the guys out there, have to be because they are warfighters, and again I go back to my basic principle of leadership... The traditional Navy model and Marine Corps model, I think will hold true in the future. Leadership of people will remain the single most important thing that we should ever do... If you take a look again at a naval ship at sea in the year 2015/2020, that ship gets into a situation where suddenly sea mines... become a problem. Due to the utilization of our computer, our information technology, our reachback capability, we should be able to use our computers and reachback to duty experts in whatever laboratory or wherever they might be to be able to get him on the hook, get him on the VTC, getting him on-line, and say here we are, we are in this location, we have this problem, the following indications and warnings have come up to us. Help us. You have that immediate reach back expertise that can help you solve that problem, and other decision making tools that the computer should be able to give us. Now I think that it is going to be incumbent on all of us to be very confident and comfortable in the utilization of information systems. The wrong thing for us to do is get into this mind set that we are going specialize and that we are going to get away from the basics and the basics being leadership."

This caption typifies the response of those who sided with the generalist vision, and it is important to notice how this senior official separated the generalist unrestricted line officer from the specialist/expert officer back in the lab. On the other end of the spectrum, those who believed that the Navy needs more specialists viewed the Naval Officers as encompassing all officers. They maintained that technology was driving the entire officer corps to more specialization because they believe that no one officer could master the requisite knowledge to be a truly successful generalist as evidenced by the following excerpt:

[We] "are going to need more specialists... I really believe that general leadership and general overall knowledge is also going to be extremely important, but I also am sympathetic to the fact that there is so much to know that the naval officer is going to have to be a specialist."

However, the theme that really stood out from both of these was the belief that there will be more specialists within the officer corps, but the Navy still needs to rely on generalists to integrate the efforts of the specialists on the battlefield. In fact, these generalists need to be more generalist than they are today as evidenced by the following two excerpts:

"I believe that warfighters need more general knowledge of the art and science of warfare. For all but the specially gifted, I suggest this takes engaging in developing depth and breadth of knowledge--of total navy capabilities, of joint capabilities, of how other government and non-governmental agencies act in contingencies, of what happens ashore that we are trying to influence, etc--earlier in an officer's professional development than happens under our current design. I think this also means that there is less time in a warrior career for the development of subspecialties that do not contribute to their warfighting development. Most senior executive level decision making positions that continue to be filled by officers (CNO, N8, e.g.) become problematic as to how we grow officers to fill them under this scenario. The shrinking force structure offers an opportunity to break people out after their commander command to become the equivalent of our old concept of a subspecialist. Such officers would never compete for a warfighting CINCdom, but they would have enough time to become a quality N8, etc. By some definitions, these are specialists. Additionally, the business of running the support functions ashore, as we discussed, entails very different leadership and management than is typical in an operating unit. The few remaining military officer billets here require something more than the classic URL who fills these jobs with no background or experience. Even if the CO positions continue to be URL positions, I suspect that we should back them up with a small cadre of officers who bring expertise in a variety of technical areas. Again, [I] suspect that an officer who intends to compete for unified CINCdom won't have the time to do one of these. I am not sure that my opinion would change much if we were able to expand career lengths. I believe that the use of military power in the early 21st century will be so subtle as to require extraordinary situational awareness that comes with full immersion. The longer career would make it possible for a warfighter to commit to that without worrying about marketability of his or her experience."

"I think that we are going to go in both directions. Certainly, knowledge is becoming more and more specialized to the point where the specialties are so narrow; they are almost not useful to a naval officer, I mean, you can't possibly learn as much as you need to know. You have to rely on specialists. I think that military officers are always going to be generalists. The operational military officer is always going to be a generalist to some degree and I guess that you could argue as specialists become more and more narrow then effectively that

makes us more and more of a generalist. So that we are more and more dependant upon these specialists to do things. So I see that we are going to be generalists, but needing knowledge in certain key areas like information science, personal psychology, but here is the key, the principal function of a generalist is to integrate. To accomplish a mission you have got to integrate a bunch of different specialties, a bunch of different people, skills, whatever you want to call it. You've got to pull things together with different resources to accomplish your mission. So it's that integrating function that is the key to actually getting the job done and we are going to have to be very good at that. That is whether you are taking about integrating combat systems or integrating forces to accomplish a mission in a joint task force or whatever, that integrative function becomes more and more crucial to success so how you do that, how you learn how to integrate. That is a very broad concept, you have to be more specific but learning how to integrate things and the various ways of integrating; technically, functionally, operationally, organizationally, that is our biggest challenge.... Integrating the system of systems, this is one of biggest challenges of the future. Learning how to do that is going to be that and training people who are good at that is going to be one of the keys of the future."

2. Theme II: Information Technology is and is going to be a core competency for Naval Officers

a. Theme

The Naval Officer of 2020 will have to be confident enough in his or her understanding of information technology and its related technologies to adapt it to and use it in warfare. This does not mean that every officer needs to have an undergraduate or graduate degree in computer science or electrical engineering, but that officers need to be educated and trained in the use of information technology and information warfare on the battlefield.

b. Justification

The interviewees overwhelming cited information technology as being the most significant change in what it means to be an effective naval officer in 2020 as witnessed by their response to question 1 of Table 8-2. They almost all noted that technology will place great demands on the officer of the future, but it is significant to note the belief that this technological dependence does not necessarily mean that all officers need to be educated in technology in the

traditional sense i.e. a technical undergraduate college major like electrical engineering or computer science or a graduate degree in the same. The following are excerpts from the responses to question 1.

"Our future officer not just naval, but all of them, warfighters are going to need to have a thorough understanding of information technology, and all of the other technologies that characterize the information age and the resultant changes in profits and organizations... If you look back at information science, I guess is a good way to say it, and it's just not the technology, but the theory of information and how you manage it, and how you package it to make it useful, how you turn it into knowledge, that is going to be as important as physics and steam engineering and things like that are to us now. I really see information science as replacing steam engineering and electrical engineering as kind of the baseline building block to knowledge that naval officers are going to need in the future."

"Officers will have to have an "intense knowledge of technology. How it is used. How to manage it. How you insert it. How you link it up with operational needs."

"It will principally be technology driven change, in particular, information technology. I think we need to look to the business world and the commercial/civilian sector to see the kinds of changes that have occurred out there in leadership and management structures and we can see a little bit of what the future challenges will be for naval officers in 2020. Such things as speed of command, dealing with information in ways that maybe we now just kind of imagine but don't have the present ability to do it. Much greater reliance on technical systems that we may not have as full an understanding as we have of the present day engineering systems. Information technology in a user friendly world that relies on delivery of equipment in a modular way that we don't really understand necessarily the interior of the modules which basically trust in their reliability and allow manpower to operate them."

The officers in the following two excerpts demonstrate the belief that not all officers need technical undergraduate backgrounds but that they need the skills to use technology.

"There is a difference between a changing technological world and a change of skills people have with technology. I don't think that we need a bunch of computer scientists to fight the problems of the future, but I know that we need people comfortable with what technology is bringing. Similarly, we need people who are adaptable to change and that is a different naval officer that we have today; a different military officer than we have today, and it might very well lead to different tactics and doctrines being effective..."

"It would have to be an absolute truism to say that their technical competence will have to be much greater than it is today, but we have to be careful. It would be bold to say as a result that every guy coming out has to be an electrical engineering or a mechanical engineering or something else. That is not necessarily the case. We can handle certain complex platforms as we have...but what it does mean is that the training will have to be very network centric, very heavily computer centric..."

3. Theme III: Naval Officers, even at the most junior level, will be required to be mentally agile and able to make quick decisions in a dynamic and uncertain environment.

a. Theme

Naval Officers in the future will have to be mentally agile. They will have to be flexible, be tolerant of uncertainty and ambiguity, and be able to successfully manage risk in an environment filled with governmental and non-governmental organizations who will attack asymmetrically. For naval forces to be effective in this dynamic and uncertain environment, senior officers believe that naval operations have to occur at a speed never before seen in history. To accomplish this feat, the Navy is using information technology and self-synchronization to flatten the organization. This flattening is driving decision making down the chain of command so that operations can respond quicker to stimuli while at the same time preventing information overload of task force commanders. One officer cites the Navy/ Marine Corps initiative regarding naturalistic decision making as a way of gaining the required mental agility.¹³⁵ Overall, this theme rejects the notion held by some that information technology will lead to centralization and more and more micromanaging. While the interviews acknowledged this threat, they all rejected the path of centralized control.

¹³⁵ Naturalistic decision making is a theory which attempts to explain how decision makers who deal with time pressure, high stakes, and uncertainty recognize a situation and choose a course of action. Experts operating under these conditions do not use rational choice processes where they construct several alternatives for evaluation, but instead rely more on their intuition, Robert Wagoner et al., "Command 21: Speed of Command for the 21st Century," *Executive Summary of the Command 21 Concept Generation Team*, Chief of Naval Operations Strategic Studies Group XVI, (June 1997), p. V-3.

b. Justification

This theme represents the merging of some responses to question 1 and question 2, and the responses to question 4 of Table 8-2. The senior civilian official in the following excerpt describes the dynamic and uncertain environment of the future and the challenge that this different environment poses for naval officers.

"Our Navy is not likely to be much different in 2020 than our Navy is today in terms of force structure, in terms of the tools that we have today, and yet I believe that the world is going to be very different in 20 years and I think that the only thing that allows you to take today's tools and be nearly as effective as the Navy has been for 223 years so far is to have an officer corps that can make it that effective... My view is that like counties no longer matter any more in terms of commerce, and states matter very little in terms of commerce, nations in the future won't matter very much in terms of commerce, and they are not going to matter much in world events. The World Tower bombing showed us like the Murrah building did in a way, like the Aum Shinri Kyo in Tokyo, which is non-government, non-allied organization like Aum Shinri Kyo are the threat of the future. The value of stability and the value of order is not going to change, but implementing order and stability is going to be harder if you don't know who you are fighting against, and weapons are tremendously inexpensive, tremendously impactful... That's the threat I see, How does the Navy fit into a world that doesn't have nations or has nations and other things but the other things aren't under the control of the other nations where information flows faster than government policies can act, where business have no international codes of conduct."

The officer in the following quote starts to describe how this dynamic environment impacts naval officers.

"They are going to need to be able to operate in a very dynamic environment. There is going to be a premium on the ability to learn as opposed to just applying what you already know to rote procedures and be able to adapt and change."

The following excerpts demonstrate how the interviewees think the Navy and the military are trying to adapt to the new environment by improving speed of command. This momentous increase in speed of command is the product of information technology flattening the organization and self-synchronization. As these excerpts indicate, these officers believe this flattening will have an important impact in what it means to be a naval officer in 2020.

"I guess you could go to a warfighting scenario. Right now, if you have a platoon commander that is leading his platoon in combat and suddenly he has contact with the bad guys and he is starting to take incoming... on his position. He is going to react to that and he is going to react to it by taking the immediate steps locally and he is also going to get on the radio and he is going to call for help. He is going to call for artillery, he is going to call for naval gunfire, he is going to call for close air support. What we have today is not cumbersome but we have a system that has grown up over the years where he then goes to his company commander or his battalion commander who goes to the brigade or regimental commander who goes to the division commander who goes through a DASS (Direct Air Support System) or SAC aboard ship, or a fire support coordination center that brings all this stuff together to coordinate the right system at the right time to go out and help that young lieutenant in combat. Well in the future, the young platoon commander up there is also going to have various hand held devices or small devices of which he will be able to neatly plug in. That device will know where he is because we will be using GPS. Everybody will know exactly where that platoon is at that time. So he will be able to plug in there a distance and range or better yet he will use a laser to go and get an exact location of where the bad guys are and he will push buttons in there and that message will flash back to a weapons system some place which is going to react quickly to be able to go and engage that target... That sounds great and that lieutenant there in theory now probably get effects on target within a minute or two or three if we do that system, but what it does now is, it takes the company commander, the battalion commander, the regimental commander, the division commander, all those people out of the system because that young lieutenant is now communicating directly with the weapon system. I am not saying that is bad. I am just simply saying that we have to deal with that. Somehow we have to build a comfort level into the chain of command that we can do that, and we have to make sure that we the necessary controls systems in there that we don't have a young lieutenant or lance corporal starting World War III on his own... It does change the chain of command, and the speed and accuracy are going to make that happen...

You need to look at it... in different dimensions. You can think of information flow as one dimension. Clearly if you are talking about information flow, you are changing the organization. That has already happened...there is already that information flow flattening... That is different from the authority relationships. What you typically show in an organizational chart, the wiring diagram, is the authority relationships. I think that there is going to be some effect on those too. What that means really is typically where there is a reporting relationship, there is also a decision making dimension there. Who has the authority to make what kind of decisions. If you really want speed of

command you are going to have to start delegating decisions to lower echelons because it just takes too long to go up the chain even with modern communications. Typically you slow things down if you have to go up to a high level to get a particular decision. So, when circumstances permit, I think you are going to see a delegation of authority to lower levels. That does not mean that wiring diagram necessarily changed. You still got the reporting relationships and you have to be very, very careful about messing around with fundamental principles like accountability and responsibilities so you have to be careful how you change the organization. You can change/ you can delegate authority without fundamentally restructuring the organization. In other words, CONOPS, how you operate, and you can do it by issue or type of decision. So you can delegate some decisions and not others. So I think that you have to maintain flexibility and how to do that, but I do see in general that there is going to be more delegation of decision making authority to lower levels... in order to achieve speed of command, and one of those things that will facilitate that is the concept of self-synchronization. One of the reasons why we hold decision-making authority at a higher level traditionally in the military is because the boss has to synchronize things by command.

If we are going to take a hill, then you got artillery and air, and infantry to participate. The company commander or the battalion commander synchronized all that. If you can depend on those elements to synchronize themselves then you can react quicker to changes in the situation. What you need/ the technology enables that and you need good horizontal communications. Everybody has got to have a good tactical picture, a common tactical picture, and then you need good guidance from the boss. Mission type orders that everybody understands.

Inescapable, that it is going to flatten the organization. The impact is much tougher to measure, and this will apply whether it is the soldier in the field or those of us on board ships. Let's take the Marine on the beach, if he has the ability which he has today, to be absolutely netted station into the entire complex land force maneuver network. Then you can see that each guy is going to play a key role and it argues that you have to get away from and you can't be stymied by traditional linear structure that has evolved. [He mentions a Wall Street commodities trading session that he attended and this was his conclusion.] The clear cut message that I came away with was that if you equate the soldier on the beach/the Marine on the beach to the youngster on the floor speaking out his bids of buy and sell. There is a need for an awful lot of more independent lateral capacity than the Marine has today. So if you are going to make that happen, you got to flatten the organization. I use that example as another reason why we got to be cured from the stovepipes and prepare for a lateral/parallel relationship or we are not going to solve this

problem... Otherwise you are never going to achieve speed of command. Speed becomes nothing but essential.

"Yes, flatter organizations, I think it will potentially reduce the officer corps but it will be a proportional reduction in that all of our systems will require less manpower to operate and maintain. The level of generalist knowledge and to some degree technical knowledge will go down into those horizontal organizations so that speed of command achieved laterally is done by officers or people with the leadership responsibilities and skills that we presently have in our officer corps."

This officer cites the Navy/ Marine Corps initiative on naturalistic decision-making which may prove to be a way to get the required mental agility.

I think that it is going to have a big impact on training. We really have to train to/ there will be change to the organization obviously or to the doctrine/ decision making and we have got to train to that. We have to train with the new technologies that we expect to deploy, but most importantly, we have to give them realistic situations to deal with. So, they can develop experience in reacting to rapidly changing situations. One of the things that I have been involved in is an area called naturalistic decision-making. This is where decision-makers are trained to develop their intuition rather than to follow a script. Some structured analytic process to making decisions in a rapidly changing environment. The Marines are looking at this pretty closely... It's based upon experience. Ideally, a good intuitive decision-maker develops his intuition through experience. One of the examples that is frequently cited is fire fighters. We went to a fire training academy up in New York City where they train battalion chiefs. The typical battalion chief has already been to a couple thousand fires by the time he gets to be a chief. So, he has already got a lot of experience on how to fight a fire. We do not have that benefit in the military. Typically, you don't get in a war your whole career. So, we have to have a way of instilling that experience and we do that with training, but it has got to be realistic scenario based training and not bogus.

4. Theme IV: Future Naval officers will have to be educated and trained in the joint arena to include coalition warfare at an early stage in their careers.

a. Theme

Future naval officers will have to be educated and trained in the joint arena to include coalition warfare at an early stage in their careers. With decision making driven down

the chain of command by the need for speed, relatively junior officers are going to need to understand the complexities of joint and coalition warfare because decisions that affect the success of the mission will be made at this level. They will have to be versed in the unified command plan as well as the strategies, doctrine, and tactics of land warfare, air warfare, and sea warfare in order to be able to apply combat power effectively in the environment of 2020.

b. Justification

This theme emerged from responses to questions 1, 2, 4, 8, and 9 of Table 8-2 and is strongly related to Theme III. The officers in the following two excerpts typify the feelings of those interviewed.

"There is no question in my mind when it comes to having the greatest fleet in the world and the greatest sailors and the greatest officers of any navy in the world, the U.S. Navy stands alone in that regard. When our fleets go to sea, when our ships go to sea, they are splendid, but what has happened in the world... and I think that the Navy is just now adapting to it, is that we are not likely to go out and fight the Soviets. There is no Soviet Navy anymore. We are not going to have great naval battles in the G-I-UK gap [Greenland-Iceland-United Kingdom] like we once envisioned. We are not going to be taking on the Soviet fleet in the middle of Mediterranean like we had planned for 20 or 30 years. The Navy has made the shift to a littoral navy, and when you take a look at what today we are buying in the fleet. We are buying things that will support that change in mission... What I am telling you is, I see a deficit in the way we educate and train navy officers because we have always trained our navy officers to be on a single plane. I mean basically below water or above water... What Navy officers are going to have to understand is that they are going to have to have an appreciation of what goes on ashore just like they do at sea because in the future we may very well have joint task force commanders who are admirals, who are Navy officers and they have to understand what is going on not just up to the shore line but what is going on 50-100 miles or whatever they could influence ashore from their platforms at sea. They need to have an understanding of what the battlefield looks like. The guys on those platforms at sea have to be able to see the same kinds of things that the ground commanders are seeing and young navy officers have to grow up and learn the skills- I think to be competent commanders ashore as well as they are at sea."

"We have to understand coalition warfare, not just the other services but other nations. I also think that we need, as we deal with these increasingly complex scenarios, where it is tougher to discriminate friend from foe, it is

tougher getting precise mission guidance, we need to become very, very adept at the interagency process. At putting together the right kind of teams, that screwing in the right kind of teams with people with very diverse agendas and skills and backgrounds. We will be dealing with them as teams. We will be leading them in some cases as teams."

This officer acknowledges that these skills need to be imparted earlier than in the past.

"Shaping events on land... involves a breadth of knowledge outside the historic circle of what officers have had to know... In order to have that knowledge in a way that enables you to think about applying combat power, I think that you need to begin to gain [this] earlier than has been done in the past."

5. Theme V: Information technology and the potential reduction in crew sizes will change what it means to be an effective leader.

a. Theme

Leadership is one of the most important aspects of being a naval officer and it will continue to be extremely important. The problem is that information technology is changing what it means to be an effective leader. It is eroding the chain of command and it is in some cases replacing interpersonal interaction between superiors and subordinates. Reduced crew sizes will increase the workload of officers and reduce the amount of time that they have to interact with the troops. In addition, there will be less redundancy in the crew thus increasing the impact of lost personnel. Wardrooms will be more senior which makes the training of junior officers problematic. We as an officer corps are going to need to deal with these challenges in order to be effective leaders.

b. Justification

This theme emerged from the responses to question 1, 2, 4, and 5 of Table 8-2. Few officers mentioned this theme, but it truly represents a significant challenge to the officer of the future. The officers in the following two excerpts illustrate the potential impact that information technology is going to have on leadership.

"The interaction between the officer and the enlisted is one of the basis of what naval leadership is all about in my opinion. You have to ask yourself the question is that going to change as we get more into the so-called network centric mentality into information technology and decentralization... I don't know that I have the answer but what I am saying to you is that I think that if you really believe that the basic premise of an officer is to continue to lead, you have to ask yourself the question, how will leadership be affected either degraded or improved by these new technologies. I just got a piece of e-mail today from the Commandant of the Marine Corps today who just got a letter last night from a PFC [Private First Class] down in Beaufort, SC who has some observations about the Marine corps policy on hazing. That [hazing] is not important to my point, but the fact is that the PFC wrote the Commandant. The Commandant read it, responded to the PFC, and has now taken that letter from the PFC and he has now sent it to all his general officers to read. Think about that for a second. You have a PFC who is at the far end of the chain of command from the Commandant of the Marine Corps who is now having an electronic dialogue with Commandant. I think that that is good. I am not saying that that is wrong, but what that does right now, is it calls into question all the other chain of command in between and how do people/how do officers and senior enlisted from the PFC to the Commandant react to that kind of thing. In the past, you know 10 years ago/ 15 years ago, if a PFC worked for me somehow went directly to the Commandant of the Marine Corps with some ideas, I would have been livid, and just about every other officer or senior enlisted, they would be livid too. You don't do that. You go through the chain of command because the chain of command back in; those days was letters, phone calls, or personal visits, but that machine over there [the computer] has changed the world...I submit to you, even from people like me who 10 years ago would have found that offensive or not offensive, that is the wrong word to use. I would have been angry. Today, I accept that because I now understand that the rules have changed dramatically. Leadership has changed dramatically. It's a lot more horizontal. It's a lot flatter than it used to be, and I think what that means to all of us who wear this rank insignia whether that is the railroad tracks of a lieutenant or whether it's the stars of an admiral or a general, we now have to understand that..."

"I think handling technology. I think that technology is going to be driving warfare, but I think that, in itself, complicates the leadership requirements of a naval officer. Just because, you are going to be dealing more remotely or hands-off, I guess, with people. One of the strengths and joys of being a naval officer today is being with the troops. I think that there will be less of that in the future and that makes it more difficult. So I think that dealing with technology not only knowing technology and how to apply it to warfare

but leading the people who have to operate it, that technology, it's going to be a real challenge."

This officer bemoans the effect of reduced crew sizes on leadership.

"I see that what will invariably happen is that when you have fewer people/ fewer enlisted on a ship, particularly in a high stress situation. It probably is going to mean a greater workload on officers. Which means the young officers in the past who would have had more time for the leadership things... making sure that their guys are happy, are now going to find themselves trapped more behind their own computers doing their own thing. What we might see is the breakdown of what I call that interpersonal communication or leadership that we hope that our officers are out there doing."

This officer describes the increased responsibility of each officer.

Each individual officer will have a greater contribution to make to the outcome of operations and warfare because there will be fewer of us. We will have more power; more leverage if you will at our fingertips so that the individual ability of an officer to contribute to overall success will be increasing.

This officer notes the increased workload on officers, the increasing dependence on technology, and the probable shift to a more senior officer mix and the resultant complications in the training of apprentice officers.

"Everybody is going to have a heavier workload. Heavier in terms of, there will be fewer people to do things on the ship. Clearly, we have automated and outsourced some functions, but I suspect that workloads will go up for people that are left particularly when things go wrong. Your automated navigation system on the bridge isn't working and you need that 7 man bridge team back. You are not going to have it if you don't work hard. I guess in a sense it will reduce your workload [in some areas], it will reduce the personnel administrative/personnel management workload. You won't have as many evals [evaluations] and things like that... You are going to be more dependent on technology. So, understanding of it and how to keep it running is going to be important. How it works so you know what it is telling you. A lot of us especially in the information technology/information management area will be depending on expert systems... that are saving you a lot of work. Like you will have an agent that will screen your message traffic. Tell it what you want to see and it will dump everything else, but you've got to know how it works so you know how to program it and you know what it is dumping so you don't miss things that you need to see as an example. So being friendly [with]/ understanding the technology and how to use it and how to keep it running are going to be pretty important to the guys that are up on the ship. My sense is

that in general, they are going to be more senior... There is not much room for apprentices.

This officer bemoans the loss of redundancy in personnel and the resultant complication in manning where every unplanned personnel loss has an increased impact on the operations of the unit.

"Certainly, it costs the Navy less to man it's ships with less people, however in the past, where you may have had a lot of depth in personnel [you no longer have that]... So the loss of one individual has more impact on your ability to do the job."

6. Theme VI: The officer of the future is going to have to be well-versed in building, participating, and leading multi-disciplinary teams.

a. Theme

The officer of the future is going to have to be well-versed in building, participating, and leading multi-disciplinary teams. As the environment becomes more dynamic and uncertain, officers will have to be able to adapt and lead teams of specialists to come up with innovative and effective solutions. This indicates a possible shift from the traditional machine bureaucracy to a more innovative adhocracy.

b. Justification

This theme emerged from questions 1, 2, and 9 of Table 8-2. Few officers mentioned this, but it is significant in that it bespeaks of a potential organizational change within the military. The current organization design is that of a machine bureaucracy whereby specialists are largely isolated in functional areas. This theme, however, describes an organization that has teams of multi-disciplinary experts. This at least on the surface describes what Mintzberg calls an Adhocracy. An Adhocracy is characterized by a "highly organic structure, with little formalization of behavior; specialized jobs based on expert training; a tendency to group specialists in functional units for housekeeping purposes but to deploy them in small project teams to do their work; a reliance on teams, on task forces, and on integrating

managers of various sorts in order to encourage mutual adjustment."¹³⁶ This change would be significant in that this kind of organization demands different leadership skills than the traditional machine bureaucracy. The officers in the following three excerpts detail their vision.

"I think that people are always going to be crucial to our success and I think that we need to beef up our understanding of psychology and particularly the psychology of organizations. How you build effective teams. That is another area, teamwork, which has always been important to the Navy and is going to become increasingly important. Teamwork on a broader scale, more complex organizations. How you facilitate people, how you build teams effectively and enable them to work together. There is going to be more ad hoc teaming whereas instead of organizations are going to have to be a lot more flexible and adaptive so you are going to have ad hoc types of organizations. That is going to place a premium on learning how to work on teams. It is a different kind of leadership from what we originally stress."

"I think also increasingly the challenge of building cohesive teams which is vitally important and increasingly more important as you rise in rank, is going to be something that officer corps of the future is going to have to be better at."

The "officer of the future is going to have to deal in multi-disciplinary environments. He will be asked to do very, very different things from one mission to the next. I guess the term to be used for that is versatility..."

7. Theme VII Outsourcing will pose some difficulties for the officer corps of 2020.

a. Theme

Outsourcing will pose some difficulties for the officer corps of 2020. Officers, even unrestricted line officers, will have to be competent contract managers and understand the incentive systems of the private sector. In addition, outsourcing could possibly have deleterious effects on sea-shore rotation and on the culture of the Navy especially with regards to an officers sense of loyalty to the Navy as measured by retention.

¹³⁶ Henry Mintzberg, *The Structure of Organizations*, (Prentice Hall: New Jersey, 1979).

b. Justification

Outsourcing or the more politically correct term, competitive sourcing, is an important initiative in the Department of Defense because it is seen as part of the solution to our modernization funding problems. The impact of this initiative on personnel is not yet clear. Most of the interviewees were unsure as to whether outsourcing should continue and to what degree it should be done in the military. However, three issues did emerge in the interviews. The first issue is that officers will have to be competent contract managers and understand the incentive systems of the private sector. The officers in the following two excerpts typify the concerns of the interviewees in this area.

"Our officers will need to understand the private sector even more than they do today because we will be more reliant on them for the provision of goods and services that in many cases provided by uniform personnel."

Outsourcing... We are not businessmen, we are trained to be warriors. We trained as warriors to work with our own kind, to work with other services, to work with coalition forces. When you start doing more and more outsourcing, I see that as a difficult transition to make because as you look at it now the true outsourcing experts are support base personnel. The more and more outsourcing you do, we are going to have more and more line officers, more warfighters that are going to be confronted with outsourcing type decisions and we are going to have to train our officers to know how to deal with that because typically the warrior does not know how to deal with that.

The second issue deals with the effect of outsourcing on officer sea-shore rotation and the third issues deal with the potential deleterious effects of outsourcing on the culture of the Navy itself. More specifically, two interviewees were concerned with the effect of outsourcing on retention. They hypothesized that the closer military officers worked with the civilians, the more the military officers would compare compensation packages and find military compensation lacking. One officer remarked that:

"At some point and time what we will find naturally is that too much outsourcing is not good that it starts breaking down the culture of the navy, it starts breaking down the teamwork of the Navy and Marine Corps. I mean you reach a certain point when you say that you can't do anymore than this because

you start affecting your sea-shore rotation policy and you start breaking down the very core values of the Navy."

A senior civilian official remarked:

"I think that it is a political decision. It sort of has become an article of faith among Republicans at least, and an increasing number of Democrats, that government is broken. Functional areas such as procurement, base ops, all could be more efficiently done by the corporations. Actually the argument by the more sophisticated people of that mindset is that if you expose the civil service or the military organization to competition they have to compete for their own jobs and just through the process of competition they will winnow themselves down and make themselves more efficient so that you will realize quite a savings... What will it do to officers? It should reduce the requirements on officers if you privatize requirements on civil servants, enlisted and officers. Somebody has got to watch sea-shore rotation... career development considerations. It's going to be interesting as you get more and more military working alongside contractors, then they are going to start comparing compensation. It's hard to get apples to apples when you do that."

8. Theme VIII: Demographic changes within the United States will pose a significant challenge for the Naval Officer of 2020.

a. Theme

Demographic changes within the United States will pose a significant challenge for the Naval Officer of 2020. The Navy cannot currently nor in the future will it be able to have the necessary number of personnel to accomplish the mission without the extensive and equitable use of women. All occupations need to be open to women based on the ability to do the job.

The naval officer corps will have to reflect society so that racial/ethnic minorities and women within the enlisted ranks have role models, and to provide the military and the Navy credibility in American society. This means that the Navy needs to not only tolerate diversity within the officer corps, but value and capitalize on it as diversity often brings innovation. Extensive diversity training is a must because naval personnel do not currently have nor is society creating sufficient cultural awareness for naval leadership to value and capitalize

on the strengths presented by diversity in the workplace in the form of racial/ethnic minorities and women.

b. Justification

This theme emerged from the responses to question 7 of Table 8-2 which asked what managing diversity meant to the naval officer of the future given the demographic shift that is predicted to take place in the next century. The majority of the interviewees regarded managing diversity as a real challenge for the naval officer of 2020. There were three specific areas that the interviewees addressed. The first one is that the naval officer corps will have to reflect society so that racial/ethnic minorities and females within the enlisted ranks have role models, and to provide the military and the Navy credibility in American society. One senior officer described the Navy's minority accession goals and remarked about their importance to the future:

"As you probably know, we have a 12/12/5 policy. We are going to be there as soon as we can. I think that we can get there by 2008. The naval officer corps is going to have to reflect the society that it comes from. If our officer corps comes from society, reflects that society, and is educated as an officer corps, then managing diversity is not a mainline issue. If we fail to meet our goals on minorities, then we are going to have what we have today, which is essentially a Caucasian male officer corps. Then, we are going to have problems. We need to put a lot of money into recruiting minorities. Not only recruiting, once you access them, make sure that they have the skills to succeed."

Another officer talked about the importance of the officer corps reflecting society for social credibility.

"I think if the government is going to do much of anything for very long it needs public support and to have that public support one of things we will have to do is mix the officer corps and the enlisted corps to be rather reflective of society. I know that there are all sorts of constraints. Right now for whatever reasons, maybe it's socioeconomic certain groups of people, ethnic groups even in the country don't do well on standardized tests, tend not to finish college, have a higher probability at getting in trouble with the law and therefore it is harder to enlist and get commissioned officers. I think in order to get the support of society we are going to have to reflect the way that society looks."

One officer remarked about the importance of cultural awareness and the fact that we need role models for our enlisted force.

"I am not sure that it means that much other than the fact that you have to be comfortable and familiar with various cultural differences, no, I take that back, ethnic differences, cultural, we are Americans and that is our culture. There may be some ethnic differences or things that people carry with them that can not appear to be foreign. I think that it has more to do with what cultural upbringing than it does with any need to adapt to an ethnic background. If you are from central Nebraska somewhere and you have never seen anybody wear a yomakah, that is foreign to you and that has an impact on how you react to them. If you are from Long Island like me and you weren't Catholic Italian like I am, then you were Jewish, you know, so seeing kids in yomakahs is not a big deal to me, and I use that as an illustrative example. It is a cultural thing. It is not an ethnic thing. One of the things that we have to do which in the Navy is we have to attract qualified, I will call them today, minorities officers... we have to attract a representative leadership, role models."

Another officer cited the importance of a reflective officer corps and the importance of role models.

"If you have 12% of your crew is black then you need to have role model black officers and chief petty officers in the crew. Not because blacks can only relate to blacks but because there has to be that type of representation."

The second area of concern for several of the interviewees was the need of the Navy to not only tolerate diversity but to capitalize on diversity because this is the path to innovation. One senior civilian official remarked that:

"I would suggest, you take a look at what navy officers look like. There is a great sameness. I have noticed that it is very slow to change. The way that you get people to move into any organization is when they know of others who are in that organization who succeeded. The first immigrants brought other immigrants. There is no question in my mind having looked at all the military services that the Navy has been the most elitist. There is an image of a naval officer. If you don't fit that image, life is tough and anyone can see the picture... It is no surprise that the Navy has had a very significant problem with minority recruiting. How many Asians do you see in the Navy, Why? Are Asians technologically inferior? Stereotypically, no. You admit that being a naval officer is very prestigious so it is not because it is an insult. It is not a move downward. That couldn't be the reason... How many role models are there?

When did we have the last Asian CNO? Why is it so ludicrous that that is what the issue is? So there aren't that many role models and so what we have is a... very clubby atmosphere in the Navy whether it is written and unwritten. It is a fact. The Navy has had a tough time integrating women. The rules are [one thing] and then the private conversations are another. No one group is better than any other. We are all Navy just like we are all Americans and that fact is, if it does not occur, the quality will decline because it makes no sense to recruit from one pool. Mathematically, I could prove it to you. You lose when you do that. I think that this is critical. I don't believe in quotas. Hopefully, there will be some representation so that you can bring on people who are the best and the brightest of all groups. Now that's good for another reason because it will help you deal with the enemy because by bringing on a diverse group you have people who understand the other side better. I think that it leads to a more effective force."

Another senior civilian official remarked that:

"For the next century or so there will still be a domination by those of European descent. For the military, there are a number of propositions. A military has got to represent its population. Otherwise it will pose a great risk. It will either become an elitist organization or a second rate organization. If a military does not represent its population, there are opportunities for divisions to form in the military which will be detrimental to its mission. The shortsighted people say substantially that you won't find people to support military capability. I have a little longer-term perspective. I don't think that you can be an effective military without having the diversity that is built into the country."

The third area addressed by some of the interviewees is the need for an education in diversity and what it means for leadership. One officer states:

"I think it means that the officer needs to have an appreciation for other cultures, other backgrounds. He needs to have some educational/ some of this is going to come through education. He needs appreciation and he may not get it from his upbringing so we are going to have to educate him."

Another officer remarks about the role of diversity training in the leadership continuum training that all officers and enlisted now have to attend:

"Managing an ethnically diverse population, mostly what we are trying to do in the formal leadership training for both officers and enlisted is to give them the tools to account for the individual sets that diversity of all kinds brings to the table... If you believe that everyone who comes into the Navy can perform to prescribed standards [then] you want to accomplish that [accession and

indoctrination] without eliminating the special uniqueness that they bring, that might enable them to see different solutions to problems."

IX. THE NAVAL OFFICER OF 2020

A. OVERVIEW

The naval officer of 2020 must be different than the naval officer of today or the naval officer of the past. The environment has changed and the military and the naval service has to change with it in order for the naval service to be effective and relevant in the dynamic and uncertain environment of the future. This demands that the combat forces, at least, within the Navy be organized in a very flat hierarchy. There will be **LITTLE** or **NO** time for information to flow up and down the chain of command. Decisions are going to have to be made at the most junior level possible. The Navy needs to undergo a transformation from the Directive Configuration/Machine Bureaucracy that it has operated with in the past and move to the Generative Configuration. Consequently, the Navy will require officers capable of working and leading in the Generative Configuration. Officers capable of making decisions and officers, more importantly, capable of leading decision makers. See Figure 9-1. This chapter will revisit the Systems Model and use it as a conceptual framework within which to describe a vision of the naval officer of 2020 and the skills, knowledge, abilities, and attributes of the naval officer of 2020. The policy implications of this vision will be discussed in Chapter 10.

B. THE SYSTEMS MODEL AND CONGRUENCE REVISITED

Chapter II introduced the Systems Model and Nadler and Tushman's Congruence Hypothesis. The Systems Model views organizations as the sum of 5 design factors: (1) Task, (2) Technology, (3) Structure, (4) People, and (5) Processes/ Subsystems. These design factors are shaped by the organization's environment/context, the key success factors, and the system direction/ strategy, and are intended to create a culture that leads first to outputs and then to

The Importance of the Naval Officer of 2020 and the RMA to Speed of Command and Effectiveness

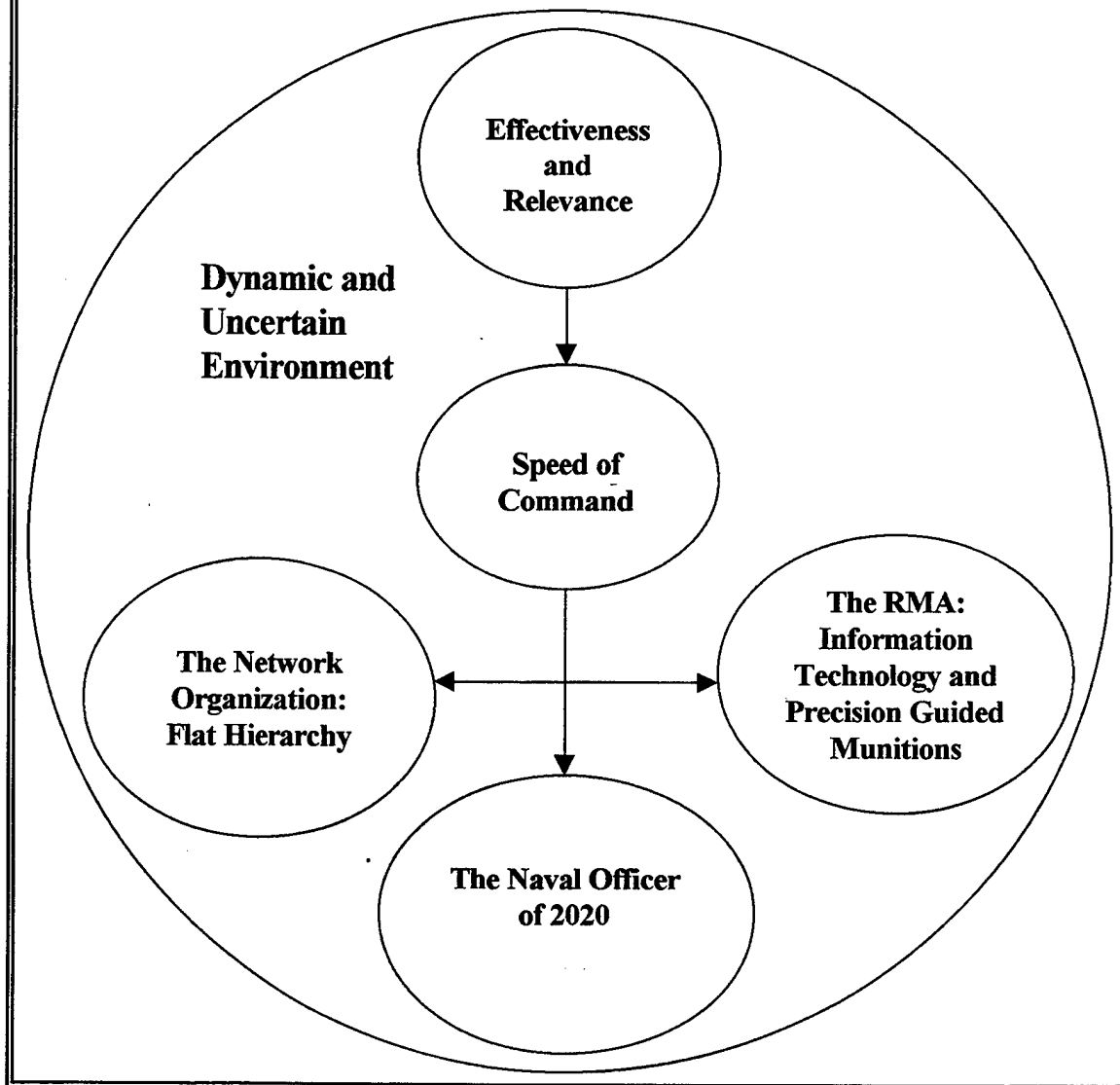


Figure 9-1. The Importance of the Naval Officer of 2020 and the RMA to Speed of Command and Effectiveness

outcomes. This Systems Model for the Navy of 2020 is depicted in Figure 9-2. Nadler and Tushman's Congruence Hypothesis states that

"other things being equal, the greater the total degree of congruence or fit among various components [design factors], the more effective will be the organization- effectiveness being defined as the degree to which actual organizational output is similar to expected or planned, as specified by strategy...Therefore, the question is not how to find the 'one best way of managing,' but how to find effective combinations of components [design factors] that will lead to congruence among them."¹³⁷

These two theories can be used to describe a vision of what the naval officer will have to understand and be able to accomplish.

The most likely environment, tasks, technology, and military structure for the Navy of 2020 are described in chapters VI and VII, and are summarized in Figure 9-2. The task is now to discern the skills, knowledge, abilities, and attributes (SKAA) that will be congruent with the other design factors and support the organization's direction and strategy.

¹³⁷ Nadler and Tushman, *Strategic*, pp. 29-30.

The Systems Model for the Navy of 2020

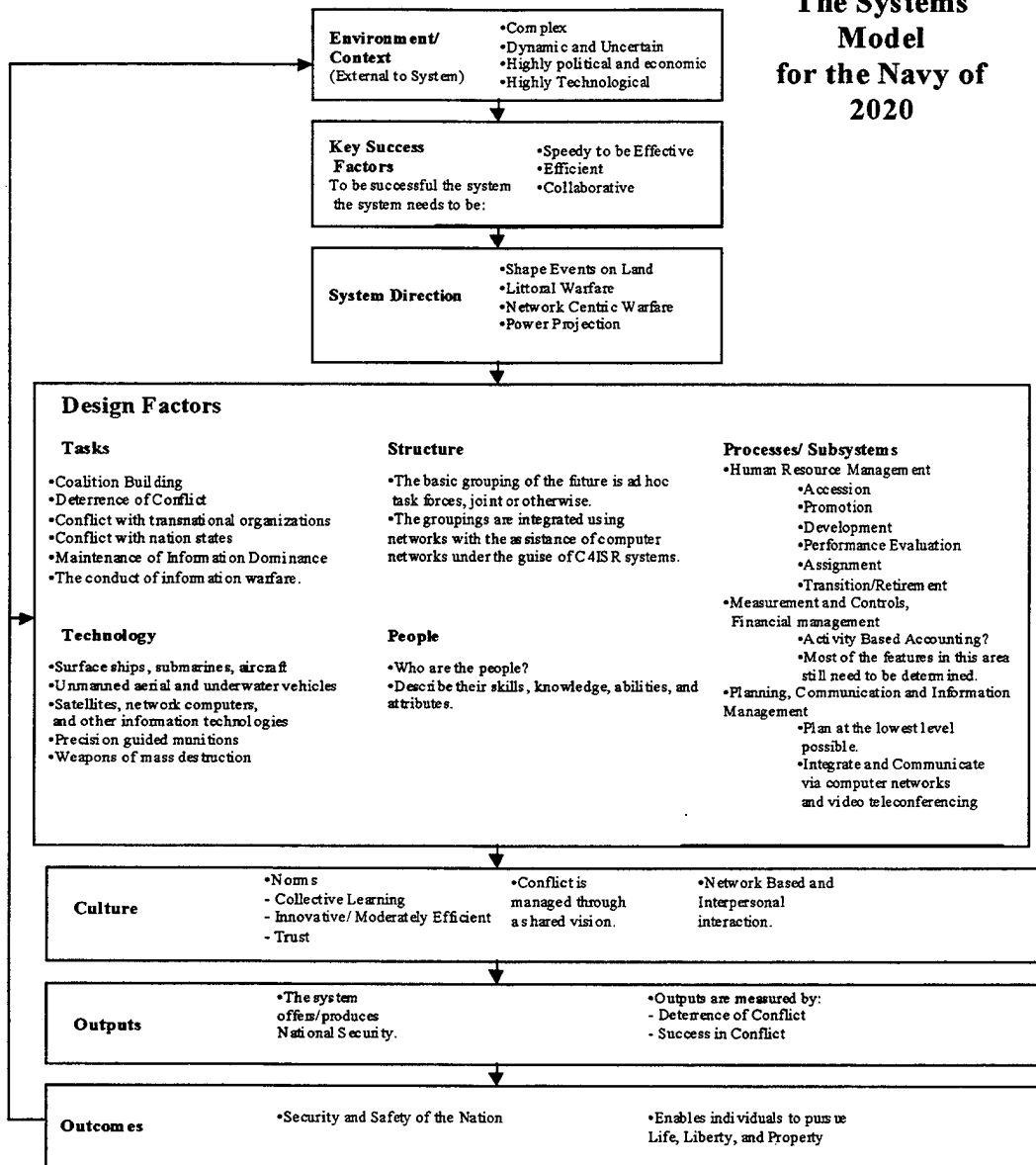


Figure 9-2. The Systems Model for the Navy of 2020.

C. A VISION OF THE NAVAL OFFICER OF 2020

1. Specialists versus Generalists

The naval officer corps of 2020 will need to be populated by more specialists than generalists (URL officers). There are three factors that will necessitate this shift. First, the future reduction in crew size and the probable shift in emphasis from manned to unmanned

aviation and precision guided missiles will lead to the need for fewer generalists.¹³⁸ Second, the growing complexity of technology, especially information technology, will require specialists capable of understanding and applying technology at greater depths than ever before throughout the fleet. A prime example is the current absence of, and need for, a designated information warfare community. Under the current system, this area is assigned to both the cryptologists (1610) and fleet support officers in the Space and Electronic Support core competency. There has been a move to merge these two groups by the Chief of Naval Operations, but after a year it has still not taken place.¹³⁹ This is an area for potential disaster as the Navy and as the rest the military grows more and more dependent on these information systems. Third and most importantly, the growing complexity of warfare will require the full immersion of the generalist warfighter into the study and use of all types of force in war and conflict short of war. As a senior military officer interviewed noted, "the use of military power in the early 21st century will be so subtle as to require extraordinary situational awareness that [only] comes with full immersion." There will not be time in the warfighters career to manage or learn how to manage an organization as large as the Navy or the Department of Defense. Consequently, the jobs in support of fleet operations that generalists have filled in the past will have to be filled primarily by specialists. Generalists or more accurately specialists in warfare while on shore duty should generally perform functions that hone their combat skills and/or create combat skills in other specialists in warfare. In essence, the URL officer needs to become more generalist and concentrate more of his time and effort on becoming more a specialist in the practice of naval warfare.

2. Skills, Knowledge, Abilities and Attributes of the Naval Officer of 2020

Table 9-1 and Table 9-2 list the Skills, Knowledge, Abilities, and Attributes (SKAA) of the officer of 2020. These were formed by synthesizing:

- (1) selected readings on modern leadership and management,

¹³⁸ Unmanned aviation and precision guided missiles will never totally eliminate the need for manned aviation. There will, however, be a shift in emphasis that will reduce the need for naval aviators and consequently will reduce the need for generalist/URL officers as aviators represent the largest part of the URL.

¹³⁹ Arthur K Cebrowski, Director Naval Warfare Development Center, to Students at the Naval Postgraduate School, 3 Aug. 98.

- (2) recent literature on the future operating environment, the future of conflict, and the revolution in military affairs,
- (3) the Skills, Knowledge, and Attributes for the field grade Army officer of the 21st Century as identified by the Science Applications International Corporation for the Army's OPMS XXI Task Force, and
- (4) the interview results of 15 active duty military officers ranging in rank from O-6 to O-10, 2 retired military officers (1 retired O-6 and 1 retired O-8), 2 senior level civilian Department of Navy officials, and 4 Professors from the Naval Postgraduate School.

The SKAA are organized into Task clusters. Skills refer to the capability to perform job operations with ease and precision. Knowledge refers to the body of information necessary to make adequate job performance possible. Ability refers to the cognitive capabilities necessary to perform a job function.¹⁴⁰ Finally, attributes are the baseline characteristics that ALL naval officers need to be successful. These SKAA are applicable to the URL officer/specialist in warfare of the future at the senior division officer/ department head level. They also apply, but to a lesser degree, to the specialists that we are going to need in the future.

I. Clusters of Skills, Knowledge, and Abilities for the Naval Officer of 2020

(A) Traditional platform centric cluster

- Ship and aircraft handling and maneuver.
- Knowledge of and the ability to apply technology on the platform level.
- Knowledge of and the ability to perform single unit operations and tactics. (More emphasis is needed here than is typically done today)

Table 9-1. Clusters of Skills, Knowledge, Abilities for the Naval Officer of 2020 (Source: Author)

¹⁴⁰ Muchinsky, p. 182.

I. Clusters of Skills, Knowledge, and Abilities for the Naval Officer of 2020 (CONT)

(B) Leadership cluster

- Ability to lead in the new era with more emphasis on collective learning and less concentration on charismatic leadership.
 3. Ability to deal with the shifting nature of power in the information age and the ability to deal with the loss of control of leaders in an information technology revolution.
 4. Ability to undertake what Senge's calls the leader's new work.¹⁴¹
 - design and/or engineer processes.
 - education and training of subordinates, superiors, and peers.
 - stewardship of subordinates and the mission.
- Ability to delegate to the lowest possible level.
- Ability to develop and embody a vision.
- Ability to build, participate in, and lead multi-disciplinary teams.
- Ability to lead and manage personnel from diverse backgrounds.
- Knowledge of the human dimension warfare and the ability to use it one's own advantage.

(C) Decision making cluster

- Ability to make quick decisions in a dynamic and uncertain environment.
- Thorough understanding of naturalistic (intuitive) decision making.
- Thorough understanding of the principles of heuristic decision making and risk management.
- Ability to use a full complement of rational analytical skills

(D) Integrative cluster

- Ability to integrate naval, joint, and coalition forces to formulate, articulate, and to link. mission requirements to direct actions.
- General understanding of the art and science of war to include:
 - Understanding of how the U.S. military and our potential allies organize to conduct military operations.
 - Understanding of the tactical, operational, and strategic characteristics of potential adversaries ranging from terrorists to world powers .
 - Understanding of the historical and contemporary role of the military in American society.

Table 9-1. Clusters of Skills, Knowledge, Abilities for the Naval Officer of 2020 (CONT)
(Source: Author)

¹⁴¹ Peter M. Senge, "The Leaders New Work: Building Learning Organizations," *Sloan Management Review*, (Fall 1990).

I. Clusters of Skills, Knowledge, and Abilities for the Naval Officer of 2020 (CONT)

(E) Information technology cluster

- Ability to employ sensors to optimal advantage.
- Ability to utilize C4I systems to obtain and disseminate information.
- Ability to utilize information systems to direct weapons.
- A general understanding of information technology and science to include topics on computers, satellites, etc.

(F) Management Cluster

- A general understanding of and the ability to apply modern management principles and techniques.
- A general understanding of financial management, contract management, and general business practices.
- A general understanding of logistics management.

(G) Communication cluster

- Ability to communicate a vision and current reality.
- A thorough understanding of the use of communications media: individual contact, meetings, video teleconferencing, e-mail, memos, etc.
- Ability to express oneself clearly and concisely in both writing and speaking.

Table 9-1. Clusters of Skills, Knowledge, Abilities for the Naval Officer of 2020 (CONT)
(Source: Author)

a. Traditional Platform Centric Cluster

The generalist naval officer of 2020 like the generalist naval officer of today will have to be capable of, understand how, and be able to drive and handle ships, submarines, and aircraft. Officers will have to be able to handle and maneuver their platforms as well as understand the engineering and operation of their platforms. In addition, officers will need a better understanding of the tactical employment of their platforms.¹⁴² There is no substitute for competence in this cluster. It is the baseline capability for the URL officer/specialist in warfare. Without this capability, the other SKAA clusters are irrelevant. Unfortunately for the naval officer of 2020, the attainment of SKAAs is not a zero-sum game. The addition of required

¹⁴² There is a perception among at least a few naval officers that there is not enough emphasis on tactical employment in the development of naval officers especially relatively junior ones. Lieutenant John Hindinger in an October 1997 *United States Naval Institute Proceedings* noted this lapse in tactical expertise at the Submarine Officer Advanced Course (Department Head School for Submarine Officers) where officers apparently failed even the most basic tactical exercises.

SKAAs in one area due to a change in the environment do not lead to reductions in SKAA in other areas rather they build on each other.

b. The Leadership Cluster

Stories like the one about Commander Evans and the *Johnston* in Chapter IV stir the blood of any leader or officer just like the stories of the one armed, one eyed English naval hero Horatio Nelson. These men were absolutely courageous and in their day, great leaders. The problem is that all too often we model today's leadership after them. Yes, there are lessons to be learned from the exploits of these great men, but the days of solely relying on charismatic leadership are waning. In today's complex and uncertain world, there is too much information for one man to digest. In addition, there is no time for the information to travel up and down the chain of command so that the charismatic leader of old can act. The world has changed. Conflict in the Naval context is almost exclusively over the horizon and dispersed. Due to the nature of future conflict, decision making will have to be driven down the chain, in order for the Navy to be effective. Speed is absolutely essential.

In addition, information technology has changed the rules of leadership. In the past, the chain of command has served as the conduit and filter for information flow between the upper and lower ranks. Today, any junior enlisted or officer can e-mail the highest levels within the Navy organization. The Marine Corps General's story in the previous chapter of the private first class e-mailing the Commandant of the Marine Corps and the Commandant sending that message to all his generals is particularly germane in this context. The ability of subordinates to bypass the chain of command electronically is making the traditional role of the chain of command increasingly irrelevant. In some cases, e-mail has reduced the amount and quality of the inter-personal interaction which has been the hallmark of the traditional leadership approach.

The major issue, that arises from the need for speed and therefore delegation of decision making and the relative irrelevance of the chain of command, is the leaders loss of control and the associated shift of power in the information age. This has and will continue to

have a significant impact on what it means to be a leader. Naval officers must adapt and find a new leadership model in order to fit into the Navy of 2020.

Peter Senge provides a potential new leadership model when he describes his vision of a learning organization. In the Senge model, the leader is not concerned with controlling the work of his organization. He ensures the organization's effectiveness through what he calls "The Leaders New Work" which is comprised of three roles. The first role is that of designer. As a designer, the leader is responsible for the designing of processes that (1) develop a vision and core values for the organization, (2) develop policies, strategies, and structures that translate guiding ideas into business decisions, and (3) develop effective learning processes. The leader is not in control of making these decisions. He is instead designing the processes to make these decisions. The second role of a leader is that of a teacher. As a teacher, the leader should "help people restructure their views of reality to see beyond the superficial conditions and events into the underlying causes of problems- and therefore to see new possibilities for shaping the future." The third role of a leader is that of a steward. According to Senge, the leader's stewardship operates on two levels: (1) stewardship for their subordinates and (2) stewardship for the larger purpose of the organization.¹⁴³ A critical component in "The Leaders New Work" is the ability to develop and embody a vision for it is this combined with the accurate view of reality that forms the creative tension that leads to generative learning.

Another important aspect of leadership that is emerging is the need for officers to be able to build, participate in, and lead multi-disciplinary teams. In the past, leaders have led organizations consisting of relatively homogenous officers. Aviators led aviators, surface warriors led surface warriors, and intelligence officers led intelligence officers. With the number of generalist officers potentially decreasing and the number of specialists potentially increasing as discussed earlier in this chapter, the need for and the growth of multidisciplinary teams is inevitable. As a senior military officer noted, the "officer of the future is going to have to deal in multi-disciplinary environments. He will be asked to do very, very different things from one

¹⁴³ Senge.

mission to the next... [and that is a skill set] that the officer corps of the future is going to have to be better at."

Another dimension in leadership that has garnered a great deal of attention in the past and will continue to demand the attention of naval leaders in the future is the ability to lead and manage personnel from diverse backgrounds e.g. ethnicity, race, and sex. Population projections for the future predict that the non-white proportion of the population will grow by 36% from 27.5% in 1998 to 37.6% in 2025.¹⁴⁴ Consequently, the ability to lead and manage personnel from diverse backgrounds will become more important as they make up more and more of the force. Several officers and officials that I interviewed noted the progress that the Navy needs to make in this area. They contend that the Navy has done relatively well in "tolerating" the integration of minorities, but it has fallen short in any effort to value and capitalize on diversity. In addition, the appropriate integration of women, particularly in recent years, has been difficult for the Navy to attain as evidenced by the examples of Tailhook and the repercussions associated with the death of LT Kara Hultgreen. Naval officers need to be skilled in creating environments that value and capitalize on the diversity in the form of racial/ethnic minorities and in the form of women in uniform. This is crucial as the role of women in the Navy expands with more and more ships being outfitted to support gender integration. Unfortunately, today's Navy is still to a large degree a "white man's club."

To be able to capitalize on diversity, the leader first needs to be aware of his own biases and emotional "baggage" and then he needs to be aware of the cultural and behavioral differences between racial/ethnic groups and/or genders. Through this, the leader can develop intercultural trust or inter-gender trust and a better cross-cultural/cross-gender understanding. The officer can then develop skills in intercultural/inter-gender communication and facilitation that will aid him in developing an environment that will capitalize on the contributions of people from diverse backgrounds.¹⁴⁵

¹⁴⁴ "Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995 to 2050."

¹⁴⁵ Cheryl D. Manning, "Managing Diversity in the United States Navy," Masters Thesis, (Naval Postgraduate School, March 1997), pp. 86-90, Beverly A. Battaglia, Skills for Managing Multicultural Teams, " *Cultural Diversity at Work*, v.4, (1992), and Charles Kreiner, Interview by author, Monterey, CA, April 18, 1998.

The final area in the leadership cluster is the need to understand the human dimension of warfare and the ability to use this human dimension to one's own advantage. The underlying truth in understanding the human dimension in war is as William Tecumseh Sherman stated, "War is at best barbarism...Its glory is all moonshine. It is only those who have neither fired a shot nor heard the shrieks and groans of the wounded who cry aloud for blood, more vengeance, more desolation. War is hell." As such, war has a significant impact on the human psyche and can significantly reduce human effectiveness and therefore military effectiveness. In *Achilles in Vietnam: Combat Trauma and the Undoing of Character*, Dr. Jonathan Shay notes several leadership and organizational characteristics that prevented or alleviated the onset of combat trauma, most notably the maintaining of unit integrity. The officer of the future needs to understand the impact of war on the human psyche and how through leadership, teambuilding, and personnel management he can prevent or alleviate the onset of combat trauma and thus maintain combat effectiveness.

c. Decision Making Cluster

The naval officer of 2020 will have to be able to make quick decisions in a dynamic and uncertain environment. Therefore, we need to treat decision making as a discrete event that is critical to mission success. Consequently, all naval officers require the tools of decision making especially at the junior level because that is where a great deal of the decisions will be made as we try to respond with great speed to the dynamic and uncertain environment. These tools include an understanding of naturalistic/intuitive decision making, for use in combat situations where speed is of the essence; an understanding of heuristic decision making and risk management, when the uncertainty is high but speed is not as essential; and finally officers will have to be skilled at rational analytical analysis for complex non-combat related decisions.

d. Integrative Cluster

This skill cluster is related to the decision making cluster in that it also is the result of the migration of decision making down the chain of command. In the past, military force was integrated through a vertical hierarchy. With speed becoming the driving factor,

vertical hierarchy is becoming irrelevant. Integration in the future will be accomplished through self-synchronization by relatively junior personnel. Consequently, senior division officers and department head level personnel will need to be able to integrate naval, joint, and coalition forces in formulating, articulating, and linking mission requirements to direct actions. This capability requires that junior naval officers have a breadth of knowledge that they have never had before. They will have to understand at least to some degree the art and science of warfare. They will be required to have a thorough knowledge of how the U.S. and any potential allies organize and conduct military operations. Junior officers will have to an understanding of the tactical, operational, and strategic characteristics of potential adversaries ranging from terrorist non-governmental organizations to other world powers. Finally, they will have to understand the historical role of the military in American society with an emphasis on the importance of civil-military relations.

e. Information Technology Cluster

Information technology is the enabler for the speed that is going to make the Navy effective and relevant in the year 2020. As such, it is going to be a core competency for the Navy. We will need specialists in both information management and in information warfare. In addition, generalist/URL officers will require a thorough understanding of the information science and information technology that enables the speed of command that we need. In particular, generalist officers will have to be able to employ a variety of sensors remote and local to their platform's optimal advantage. They will have to be able to utilize C4I systems to obtain and disseminate information, and finally, they will have to be able to use information obtained via the network to direct weapons, and they will have to be able to do this fast, very fast.

f. Management Cluster

Over the years, people have argued over the differences between leaders and managers and over which area, leadership or management, it is best to place emphasis. As introduced in Chapter IV, leadership in this context refers to the setting of system direction while management is the mastery of system design elements. Consequently, naval officers, in order to be leaders, have to be competent managers, first. This is a baseline capability and not a

competitor or detractor from leadership as so many have implied. As such, the naval officer of the future requires a general understanding of the modern principles and techniques of management. In particular, this includes an understanding of financial management, contract management, and general business practices, because as competitive sourcing/outsourcing becomes more widely done within the Department of Defense (this is inevitable because of the need for funds to re-capitalize the force), officers particularly specialists but even URL officers/specialists in warfare will need to be able to interact with and in some cases manage and lead personnel from the private sector. Finally, officers will need a general understanding of logistic management because it is an essential dimension to the application of force, especially for the distances over which the United States military needs to be able to apply force.

g. Communications cluster

An essential dimension of management and leadership is the ability to communicate. This has been critical in the past, and as the information age overwhelms us with droves of more and more data, it will be critical in the future, probably more so. Naval officers need to appreciate the intricacies of communication especially with regards to the importance of shared schema in creating shared visions of reality and shared visions of the future. Officers need to understand that the highly active mind of the reader/listener is not only the decoder of what is trying to be communicated to him, but is also the supplier of much of the essential information that is not being written or spoken.¹⁴⁶ Therefore, an essential part of communication is the training and imbedding of a common schema in the entire organization.¹⁴⁷ For without this common schema, true dialogue within an organization is nearly impossible

In addition, the officer of the future will require a thorough understanding of communications media, e.g. face to face, e-mail, and video conferencing. Each media

¹⁴⁶ A prime example of this is in the naval setting is phone talking. New personnel often have great difficulties understanding initially what is being said over sound powered phones. Over several days and months, these new personnel rapidly pick up the schema and are able to understand communications even when they are garbled.

choice has its own advantages and disadvantages and is appropriate in different situations.¹⁴⁸ The leader needs to understand and be able to apply this knowledge to improve his effectiveness. Finally, the naval officer needs to be able to express himself clearly and concisely in both writing and speaking. Time is of the essence in the dynamic environment of the future. Officers require this skill to be successful, today and tomorrow.

II. Attributes of the Naval Officer of 2020

A. Engenders Trust through

- Honesty/ Integrity
- Responsibility
- Honor/Dedication to Duty
- Courage

B. Inspires Loyalty

C. Creative/ Innovative

D. Action-Oriented

E. Views Their Self in Proportion

F. Disciplined/ Professional

G. Mutuality/Systems Perspective

Table 9-2. Attributes of the Naval Officer of 2020 (Source: Author)

h. Attributes

Attributes in this case refer to the characteristics that all naval officers should possess. As one senior officer remarked to me, "these are the price of admission."

- The first and most important attribute is that an officer engenders trust. There are two dimension to this attribute. The first, is that an officer engenders trust in his subordinates so that they feel secure enough to make decisions on their own without fear of significant reprisals. The second, is that officers engender trust in their superiors and peers to make the "same kind of" decisions that either the superiors or their peers would make. It is important to note the difference between the "same decisions" and the "same kinds of decisions". The former implies a lack of freedom while the latter implies that the subordinate can show initiative and has

¹⁴⁷ E. D. Hirsch, "The Discovery of Schema," *Readings in Managerial Communications*, edited by Gail Fann Thomas, Jim Suchan, and Bob Barrios Choplin, 2nd ed., (Simon and Schuster Custom Publishing: Needham Heights, MA, 1997), pp. 51-63.

the freedom to act. Both dimensions of engendering trust are critical prerequisites for any learning or networked organization. Engendering trust, itself, has four prerequisite officer traits which if absent will prevent the development of engendering of trust. These traits are:

1. Officers must be honest and have integrity no matter the consequences.
 2. Officers must be responsible for their actions.
 3. Officers must be honorable and dutiful. They must stand up for and do what they believe is right regardless of the repercussions.
 4. Officers must be courageous in combat and in everyday life.
- Like today, officers must inspire loyalty to the mission, the Navy, and their country (patriotism). We are charged with going into harms way. Loyalty is a vital ingredient in the glue that keeps us together.
 - To deal with the dynamic, complex, and uncertain environment of the future, officers must be creative and innovative to be successful. They must recognize that each situation that they encounter is not exactly the same as the last and that cookbook tactics and strategies, while at times are helpful, do not cover the full complexity of every scenario.
 - Naval Officers must be action oriented. The environment of the future demands speed and we need officers who are not afraid to make the tough decision even if they are the wrong decisions. In many cases, a wrong decision is easier to recover from than a decision put off.
 - Officers need to view their self in proportion to the organization. Many people have cited the "evils" of careerism in the military. This is hypocrisy. The rational model of human behavior states that people do what is in their own perceived best

¹⁴⁸ Linda Kleebe, et al., "Understanding Managers' Media Choices: A Symbolic Interactionist Perspective," *Readings in Managerial Communications*, edited by Gail Fann Thomas, Jim Suchan, and Bob Barrios Choplin, 2nd ed., (Simon and Schuster Custom Publishing: Needham Heights, MA, 1997), pp. 51-63.

interest.¹⁴⁹ Officers must instead put their best interest in perspective and be able to align their actions with the good of the organization in mind.

- Leadership is hard and it takes a great deal of commitment. Officers must be disciplined and professional to survive it's rigors.
- Officers need to have mutuality and be able to think using a systems perspective. They need to be able to see the grand scheme and where their organization and their actions fit in and be able to act for the greater good of the system.

¹⁴⁹ Allan C. Stockman, *Introduction to Economics*, (The Dryden Press: Fort Worth, 1996), p. 23.

X. POLICY IMPLICATIONS AND CONCLUSION

A. OVERVIEW

The vision of the naval officer of 2020 presented in this thesis demands revolutionary change in Navy human resource management. The current system will not create the kind of officer we need in 2020. As a whole, our current system tends to hamper innovation and does not prepare junior officers for the decision making that they will have to do in the future. It is not congruent with the direction of the Navy or the future environment in which the Navy is going to operate. Consequently, the system requires drastic and radical change. This radical change does not, however, have to occur overnight and it would be disastrous if it did. We do not have a sufficient inventory of people who can operate in the future environment and in the future Navy. We need to take the systems approach and design processes that are congruent with our vision. In particular, we need to steer our personnel development and management systems in the right direction. With the right processes, we can get to 2020 with the officers that we need to succeed.

B. PART 1: A SHARED VISION OF THE FUTURE NAVAL OFFICER

The first step in our journey to the naval officer of 2020 is for the Navy to develop a shared vision of what will make the future officer successful. This vision needs to be understood and actively supported by the entire organization from the Chief of Naval Operations to the "nub" ensign in the fleet. To formulate this shared vision, the officer corps needs to conduct an open dialogue throughout the organization. This is not a time for top down directed change. A great deal of work needs to be done in this area.

C. PART 2: THE DESIGN OF CONGRUENT PROCESSES

Human resource management as described in Chapter II and Chapter V has 7 functions: accession, development, promotion, evaluation, compensation, assignment, and

separation/ transition. The manner in which each of these functions is conducted needs to be in congruence with the task, technology, structure, and people in the organization for the organization as a whole to be more effective. Therefore, comprehensive studies need to be conducted that determine how best to align human resource management with the organization's shared vision. My recommendations for aligning human resource management with the Navy's direction are summarized in Table 10-1. The overarching conclusion, however, is that every aspect of human resource management should be decentralized and directly related to performance in one way or another, either group performance or individual performance. Every aspect of our system should emphasize effectiveness, collaboration, and efficiency.

1. Reshape the Officer Corps

As discussed in the two previous chapters, our Navy will require more specialists in the officer corps of 2020. Where will we get these specialists? We will get them from the URL after their department head tours. A lateral transfer after the division officer tour or preferably the department head tour ensures that the specialists will have a basic understanding of what operating forces do and the constraints on operating forces. We will then educate and train these former URL officers in specialties in information operations, fleet support, or engineering. Finally, we will need to create viable career paths to flag rank for these officers to demonstrate that they are a vital part of the organization. The remaining URL/specialists in warfare officers will shift generally to shore duties that involve the honing of their warfighting skills or the creation of warfighting skills in others. They should obtain graduate degrees in fields that enhance their warfighting ability. In addition, the best officers should periodically be sent to schools where the next generation of warriors in their respective community are being educated and trained.

In addition, a community or communities need to be created that are charged with information systems management, information systems defense, and offensive information war. As discussed earlier, there is an initiative currently being pursued that will do this, but it has not come to fruition as of yet. We need to fill these information technology communities using

Recommendations

1. Reshape the officer corps.

- Increase the population of specialists through post division officer or preferably post-department head lateral transfer of URL officers to the RL. Educate and train them in specialties such as: information operations, fleet support, or engineering and create viable career paths for these officers to flag rank.
- Shift the remaining URL/specialist in warfare officers to shore duties that involve the honing of their warfighting skills or the creation of warfighting skills in others.
- Create a community or communities charged with information systems management, information systems defense, and offensive information war

2. Access the Naval Officer of 2020.

- The Navy needs to use all means to meet its officer diversity goals in its 12/12/5 Policy. In addition, the Navy needs to incorporate the accession of women officers into its diversity programs.

3. Develop the Naval Officer of 2020.

- Integrate the indoctrination of the officer corps by placing the Naval Academy under the cognizance of the Director of Naval Training (N7).
- Charge the officer accession sources and the initial and intermediate level skills courses like the Submarine Officer Basic and Advanced Courses and the Surface Warfare Officer School's Division Officer and Department Head Courses with developing curriculum that support the SKAAs of the new naval officer. Enlarge program scope and length as necessary.
- Conduct further study on the development of intuitive/naturalistic decision making. Design programs to create these abilities at all levels within the officer corps.
- Increase tour length at sea and shore. Consider means to reduce the impact of longer tours on quality of life by looking at ways to reduce OPTEMPO/PERSTEMPO through the use of multi-crew ships.
- Assign all generalist officers and specialist officers as applicable to two professional military education experiences. The first should be more oriented toward the technical and science aspects of war while the later experience should be oriented toward the strategic art of war. Specialist officers as a minimum should have at least one professional military education experiences in their area of specialization.

Table 10-1. Recommendations (Source: Author)

Recommendations (CONT)

3. Develop the Naval Officer of 2020. (CONT)

- Develop competency to manage diversity in all officers through extensive and on-going diversity training.

4. Promote the Naval Officer of 2020.

- Advise Congress to revise or rescind DOPMA.
- Consider establishing a rank-in-position promotion system rather than a rank-in-person promotion system or if that is not feasible, enlarge promotion zones and adjust promotion rate targets as necessary to support a more stable up and stay career structure.

5. Assign the Naval Officer of 2020.

- Consider shifting to a more decentralized assignment process whereby the officer applies for his next position directly to his prospective senior through the use of information technology.¹⁵⁰

6. Compensate the Naval Officer of 2020.

- Base pay at least some extent on performance rather than totally on longevity. This performance measure can be either group or individual based depending on the context of the situation.
- Reduce the emphasis on non-pecuniary benefits and shift this money to raise regular military compensation.

7. Evaluate the naval Officer of 2020.

- Ensure that the Behaviorally Anchored Rating Scale currently in use reflects our vision of the successful naval officer of 2020.
- Consider the use of a 360 degree evaluation system.

8. Separate/ Transition the Naval Officer of 2020.

- Increase career length to at least 35 years and perhaps longer to maximize the utilization of the experience that we will be building in our specialists and our generalist warfighters.
- Consider shifting retirement benefits to either a defined contribution plan like a 401K or maintain a defined benefits plan that vests somewhere between the 5 and 10 year point but does not pay out benefits until actual retirement age.

Table 10-1. Recommendations (CONT) (Source: Author)

¹⁵⁰ Jules Borak, Interview by author, Naval Postgraduate School, 29 April 1998.

inputs from the cryptology community, parts of the fleet support community, and officers from the unrestricted line. In addition, we should consider the use of lateral entry from the civilian sector, as necessary, to cover areas of expertise not sufficiently covered by uniformed expertise.

2. Access the Naval Officer of 2020

The Navy needs to use all means to meet its officer diversity goals in its 12/12/5 Policy, and it needs to incorporate the accession of women officers into its diversity programs. This is crucial because the minority representation within our enlisted force needs role models. In addition, the Navy and the military need credibility in the eyes of Congress and the American people, and that credibility comes from the Navy and the military reflecting society. Without that credibility, it may become hard to garner the resources necessary to successfully accomplish our mission. Finally and most importantly, diversity is critical to mission success in that it often is accompanied by unconventional thinking that often provides us with the answers to complex problems. Consequently, we need to value and capitalize on diversity and use it to our advantage.

3. Develop the Naval Officer of 2020

We should integrate the indoctrination of the officer corps by placing the Naval Academy under the cognizance of Director of Naval Training (N7). In our quest to reach the naval officer of 2020, we need to all move in the same direction toward our shared vision. Competition between the Naval Academy and CNET is counter-productive to these purposes. In addition, our officer accession sources and the initial and intermediate level skills courses like the Submarine Officer Basic and Advanced Courses and the Surface Warfare Officer School's Division Officer and Department Head Courses need to be charged with developing curricula that support the SKAAs of the naval officer of 2020. This will require an enlarging of some of these programs with regards to scope and length. All URL officers/specialists in warfare and specialist officers as applicable will need to be assigned to at least two professional military education experiences. The first should be more oriented toward the technical and science aspects of war possibly at the Naval Postgraduate School while the later experience should be

oriented toward the strategic art of war possibly at one of the War Colleges. Specialist officers as a minimum should have at least one professional military education experiences in their area of specialization. This education should most likely take place at the Naval Postgraduate School due to the DoD focused education that is obtained there.

We need to conduct further study on the development of intuitive/naturalistic decision making, and design programs to create these abilities at all levels within the officer corps. This is an area of much promise at least on the surface. It may aid us greatly in achieving the speed of command that we will so desperately need in the future environment.

We need to increase tour length at sea and shore. The current Naval Officer Career Path breeds a "minimalist" philosophy among officers. Officers tend to be risk adverse and lack empowerment due to sea and shore tours that are too short to develop officers properly and too short for the officer to risk changing the system and reaping the subsequent benefits. Under the current system, there is little incentive for the officer to "own" the performance of their unit in any long-term sense. The problem with this, however, is the spillover effect on retention. The perception, and it is probably right, is that longer at sea times will lead to a reduction in quality of life which will cause significant problems with officer retention. To reduce the impact of longer tours on quality of life, we need to consider means to reduce OPTEMPO/PERSTEMPO possibly through the use of multi-crew ships.

Finally, we need to develop the competency to manage diversity in all officers through extensive and on-going diversity training. This development needs to occur for two reasons. First, the potential racial/ethnic and the potential female populations within the Navy are increasing. We as officers need to be able to understand and lead these groups of minorities and women. Second and potentially more important, the rapid infusion of racial ethnic minorities and women into any organization often leads to white males becoming angry and disengaging from the organization.¹⁵¹ The Navy can not afford to have any portion of its population disengaging from the organization. We need managing diversity training for white males, in

¹⁵¹ Frederick R. Lynch, *Invisible Victims: White Males and the Crisis of Affirmative Action*, (Praeger: New York, 1991), except in Taylor Cox and Ruby Beale, *Developing Competency to Manage Diversity*, (Berrett-Koehler Publishers, Inc.: San Francisco, CA, 1997), pp. 104-105.

particular, to ensure that they do not feel threatened and that they remain engaged in the Navy of 2020. Navy leadership must model behavior that indicates authentic acceptance of differences and demonstrates an understanding of the connection between valuing differences and increasing the probability of success of the Navy's missions.

4. Promote the Naval Officer of 2020

We need to advise Congress to revise or rescind DOPMA. It greatly restricts our flexibility in tailoring a system to support our strategy through strategic human resource management. Second, we need to consider establishing a rank-in-position promotion system rather than a rank-in-person promotion system. A rank-in-position system would eliminate the need for promotion boards. An individual's rank would be dependent on the level of responsibility associated with his current position. As such, officers would have more incentive to perform because if they are not selected for a new assignment at the same level or a more advanced level, they would be demoted to the rank of the position that they are qualified for. This would give us a great deal more flexibility in rewarding innovation and good performance as it is more directly based on performance than the current rank-in-person system, and it would account for the fact that not everyone develops at the same rate. If a rank-in-position is found not feasible, we should enlarge promotion zones and adjust promotion rate targets as necessary to support a more stable up and stay career structure as Thie et al. suggested in their 1994 study of officer career management systems.¹⁵²

5. Assign the Naval Officer of 2020

Coupled with the rank in position promotion system, we need to consider shifting to a more decentralized assignment process whereby the officer would apply for his next position directly to his prospective senior through the use of technology. This would directly tie performance to assignment and thus give the individual officer added incentives to perform because his rank is dependent on performance. In addition, it would give seniors the ability to build and tailor their own teams for mission accomplishment. Finally, it would serve as a

¹⁵² Thie and Brown, pp. 197-199.

motivator for commanders/seniors to perform well because if they do not, they will have difficulty attracting qualified personnel.

6. Compensate the Naval Officer of 2020

We need to base pay at least to some extent on performance rather than totally on longevity. There can still be a component of pay that is based on longevity to insure internal equity, but there should be a variable component under the control of the unit commander that is dependent on some performance measure. This performance measure can be either group based or individual based depending on the context of the performance. This change will motivate officers to perform and innovate because performance means money. In addition, commanders could use it under the decentralized assignment process to attract quality personnel or if necessary use it as a wage differential to overcome unattractiveness of some duty stations.

Outsourcing or competitive sourcing is increasing the amount of contact between civilian workers and military personnel. This has led to a greater awareness of military personnel to the opportunities in the civilian sector. When military personnel compare civilian wages to military wages, the military wages invariably come up short. The truth, however, is that the military-civilian wage gap is not as large as it seems to many because of the relatively large amount of non-pecuniary benefits that military personnel are entitled to. Unfortunately, the truth will not stem the tide of people who will leave because of perceived differentials and opportunities on the outside. To combat this potential loss of people, we need to be on the same playing field as the civilian sector. We should reduce the emphasis on non-pecuniary benefits and shift this money to raise regular military compensation so that our people when comparing military and civilian wages can "compare apples to apples instead of oranges and apples." An added benefit to this shift in compensation is the potential savings in military infrastructure.

7. Evaluate the Naval Officer of 2020

We need to ensure that the Behaviorally Anchored Rating Scale currently in use reflects our vision of the successful naval officer of 2020. Evaluation is a critical aspect in

validating to the entire officer corps what it takes to be successful. If evaluations do not reflect our shared vision of the SKAAs of the successful naval officer, officers will have a significant incentive to undermine the attainment of the shared vision. In addition we should consider implementing a 360 degree evaluation system. A 360 degree evaluation system would consist of subordinate evaluations of the officer, peer evaluations of the officer, in addition to the standard senior evaluation. As such, this would incentivize officers to be better stewards for all parts of the system and would provide a great deal more feedback for the officer to learn about their performance.

8. Separate/ Transition the Naval Officer of 2020

In order to maximize the utilization of the experience that we will be building in our specialists and our generalist warfighters, we need to increase the allowed career length of our non-flag officers to at least 35 years and perhaps longer. We are going to invest significant amounts of time and money into these officers. It is counterproductive to force them to leave while they can still contribute to mission accomplishment. In a related concept, we need to seriously consider shifting retirement benefits to either a defined contribution plan like a 401K or maintain a defined benefits plan that vests somewhere between the 5 and 10 year point and has an increasing benefits based on time in service but does not pay out benefits until actual retirement age. The current system gives people a very powerful incentive to leave at the 20 year mark. They get retirement benefits immediately and they are still young enough after 20 years in the military to pursue a second career. This does not lead to an effective nor efficient use of human capital. Either the defined contribution plan or the 5-10 year vesting plan has the potential to at least support our future shared vision. Both of these plans would give officers the incentive to stay past 20 years. In addition, it would reduce the amount of officers who are just waiting to retire with 18 and 19 years of service. Finally, both of these plans are so different from the current plan that it would be difficult to assess the impact of any change on individual officer's career. Consequently, any potential effect on retention would be minimized.

C. A FINAL WORD

Our environment has changed and will continue to change. Our tasks, technology, and structure are changing with Joint Vision 2010 and Network Centric Warfare to meet the challenges of the dynamic and uncertain future. We need to align our people and human resource management with technology and structure to transform the Navy to the Generative Configuration. We as an organization need to be effective, collaborative, and efficient in order to be successful. Speed and responsiveness need to permeate through every "nook and cranny" of the organization. This requires that we develop a shared vision of the future naval officer and that we align our human resource management with this vision. The needed changes will require a great deal of open dialogue and comprehensive research.

APPENDIX A: TECHNOLOGICAL TOOLS OF TODAY'S NAVY

A. OVERVIEW

This appendix is a brief description of the technology currently in the force in the form of platforms, weapons, and C4ISR systems. It is not a complete list of Navy technology. The purpose of this section is to give the reader a feel for the Navy's current level of technology. The information is unclassified and was predominantly obtained from the United States Navy Homepage and Norman Polmar's *The Ships and Aircraft of the U.S. Fleet* (1987) which was published by the United States Naval Institute Press.

B. THE AIRCRAFT CARRIER AND THE NAVAL TACTICAL AVIATION WING

The centerpiece of the Navy's warfighting force has been and is the aircraft carrier and its attendant naval tactical aviation wing. Since the battle of Midway Island in 1942, United States aircraft carriers have dominated the world's oceans. The key to this dominance has been the steam powered catapult.

"One of the reasons American carriers have been so effective is because the aircraft that have flown off of them have been as capable as land-based aircraft. Land-based aircraft- even-single engine fighters without heavy bomb loads- are heavy, which means that they need long runways for their engines to reach takeoff speed. These long runways are not available on carriers. The American innovation, simple in conception, complex in design, and revolutionary in political significance, was the steam-powered catapult. What the catapult did was accelerate the aircraft dramatically, so that, with its engine at full throttle, it would be hurled off the end of the carrier deck at a speed sufficient to make it airborne. The stresses involved in takeoff and landing meant that aircraft had to be particularly robust, designed to withstand high g's. This drove up the price of carriers and their planes dramatically. But because of the catapult, attack aircraft could carry substantial tonnage of munitions to the target." ¹⁵³

¹⁵³ Friedman, p. 181.

Aircraft carriers have given the Navy the ability to conduct strike and sea control missions independent of land bases. This capability has contributed significantly to the national military strategy.

1. Aircraft Carriers

The primary United States aircraft carrier in the current inventory is the *Nimitz* Class aircraft carrier. The *Nimitz* and her six sister ships are powered by two water-cooled nuclear reactors which can propel the ship up to speeds of greater than 30 knots. The *Nimitz* is manned with 3,200 ship company personnel and 2,480 air wing personnel. The ship carries approximately 85 aircraft in addition to Sea Sparrow surface to air missiles and the Phalanx Close-In-Weapons-System (CIWS). The *Nimitz* first deployed in 1975 and there are currently two new *Nimitz* Class carriers under construction.

The other nuclear power aircraft carrier is the *Enterprise* which was first deployed in 1961. The *Enterprise* is powered by eight water-cooled nuclear reactors and like the *Nimitz* can reach speeds greater than 30 knots. The ship is manned with 3,350 in the ship company and 2,480 in the air wing. The *Enterprise* also like the *Nimitz* carries an air wing of 85 aircraft and is armed with both the Sea Sparrow missile and the Phalanx CIWS.

The four remaining carriers are conventional powered and are members of the *Forrestal* Class, the *Kitty Hawk* Class, and the *John F. Kennedy* Class. The first ship of each class was first deployed in 1955, 1961, and 1968 respectively. Each carrier is powered by eight boilers and, like their nuclear powered brethren, they can reach speeds greater than 30 knots. These ships are manned with a ship crew that ranges from 3,019 to 3,117 personnel and all have an air wing of 2,480 personnel. The *Forrestal* Class Carrier *Independence* has 75 aircraft while the remaining two classes have 85 aircraft. All these carriers have both Sea Sparrow missiles and the Phalanx CIWS.

2. Strike Aircraft

The strike aircraft of the Navy arsenal is the F/A-18 *Hornet*. The *Hornet* is an all-weather fighter and attack aircraft that either seats one or two aviators depending on the model. It was designed for traditional strike applications such as interdiction and close air

support without compromising its fighter capabilities. The *Hornet* is powered by two turbofan engines that give it a range of 1,379 nautical miles as a fighter and 1,333 nautical miles as a strike aircraft. In addition, the *Hornet* can reach speeds greater than Mach 1.7. It is armed with a 20 mm canon and can carry a myriad of missiles weighing up to 17,000 pounds not including the two AIM-9 Sidewinder missiles on the wingtips. The ordnance that the *Hornet* can deliver are listed in Table A-1.

F/A-18 Ordnance

AIM-9 *Sidewinder* air to air missile
AIM-7 *Sparrow* air to air missile
AIM-120 *AMRAAM* air to air missile¹⁵⁴
AGM-84D *Harpoon* Anti-ship missile
AGM-84E *SLAM/SLAM-ER* Stand-off Land Attack Missile
AGM-65 *Maverick* Guided Missile
AGM-88 *HARM* High Speed Anti-Radiation missile
AGM-45 *Shrike* Anti-Radiation Missile
AGM-62 *Walleye* Glide Bomb
Joint Stand-Off Weapon (JSOW)
Joint Direct Attack Munition (JDAM)

Table A-1. F/A-18 Ordnance (Source: "Navy Fact File," *United States Navy Homepage*, April 1998)

The A and B models first saw service in 1983 and the C and D models first became operational in 1987.

3. Fighter Aircraft

In addition to the *Hornet*, the Navy uses the F-14 *Tomcat* in the fighter aircraft role. The F-14 *Tomcat* is a supersonic, twin engine, variable sweep wing, two seated fighter designed to attack and destroy enemy aircraft at night and all weather conditions. The two turbofan engines with afterburners give the *Tomcat* a range of 500 nautical miles in the air intercept configuration at speeds up to Mach 2.4. It is armed with a 20 mm canon and up to

¹⁵⁴ AMRAAM is an abbreviation for Advanced Medium Range Air to Air Missile.

13,000 pounds of AIM-54 *Phoenix* missiles, AIM-7 *Sparrow* missiles, AIM-9 *Sidewinder* missiles, and/or air to ground ordnance. The *Tomcat* was first deployed in 1973.

4. Carrier Based Fixed Wing Undersea Warfare Aircraft

The primary carrier based fixed wing asset used in the Undersea Warfare role is the S-3B *Viking*. The *Viking* is extremely versatile aircraft that can in addition to the undersea warfare role be used as an armed scout in the anti-surface role as well as the capability of being equipped for tanking, mining, and limited electronic surveillance.¹⁵⁵ The four seat aircraft is powered by two turbofan engines that give the aircraft a range of 2,300 nautical miles at speeds of up to 450 knots. The *Viking* can be loaded with almost 4,000 pounds of ordnance including the AGM-84 *Harpoon* missile, the AGM-65 *Maverick* missile, the MK-46 torpedo, the MK-50 torpedo, in addition to mines, rockets, and conventional bombs. The aircraft was first deployed in 1975.

5. Carrier Based Electronic Warfare Aircraft

The Navy depends on two aircraft to perform in the electronic warfare role. The first one is the E-2C Hawkeye. The Hawkeye provides airborne early warning, command and control, surface surveillance coordination, strike and interceptor control, and search and rescue. The Hawkeye has a crew of five and has two turboprop engines that give it a range of 200 nautical miles with an on station time of six hours at speeds of up to 300 knots. The distinctive feature of the E-2C is the round APS-125 radar saucer mounted on the top of the aircraft. The Hawkeye is not armed and was first deployed in 1964.

The second is the EA-6B Prowler which is the Navy's electronic counter-measure aircraft. The Prowler provides an umbrella of protection over strike aircraft and ships by jamming enemy radar, electronic data links, and communications. The aircraft carries a crew of four and is basically a modification of the now retired A-6 Intruder airframe with two turbojet engines. The EA-6 has a range of over 1,000 nautical miles with speeds of up to 500 knots.

¹⁵⁵ When the S-3B is outfitted for electronic surveillance, the aircraft is redesignated to be an ES-3 Shadow. The primary difference between a Viking and a Shadow is that the bomb bay has been converted to avionics racks.

The aircraft can be armed with two AGM-88A HARM missiles and was first operational in 1971.

6. Weapons of the Naval Tactical Aviation Wing

The weapons of choice today in the Navy's arsenal are precision guided munitions of both the air to air and the air to ground categories. Air to air missile are divided into ranges: long range, medium range, and short range. The following table, Table A-2, summarizes the key characteristic of each air to air missile:

Air to Air Missiles of the Carrier Tactical Aviation Wing					
Missile	Primary Function	Warhead	Range	Guidance System	Date Deployed
AIM-54 Phoenix	Long Range Air to Air	135 lbs	100 NM	Semi-Active/ Active Homing	1974
AIM-120 AMRAAM	Medium Range Air to Air	30-50 lbs	40 NM	Command-Inertial/ Active Radar Homing	1991
AIM-7 Sparrow	Medium Range Air to Air	90 lbs	30 NM	Semi-Active	1976
AIM-9 Sidewinder	Short Range Air to Air	20.8 lbs	10 NM	Infra-red	1956

Table A-2. Air to Air Missiles of the Carrier Tactical Aviation Wing (Source: "Navy Fact File," *United States Navy Website* and Norman Polmar, *The Ships and Aircraft of the U.S. Fleet* 14th ed.)

The air to ground missiles of the carrier air wing are divided into anti-ship missiles and air to ground missiles. Table A-3 summarizes the key characteristic of each anti-ship and air to ground missile.

Anti-ship and Air to Ground Missiles of the Carrier Tactical Aviation Wing						
Missile	Primary Function	Warhead	Range	Speed	Guidance System	Date Deployed
AGM-84D Harpoon	Anti-ship	488 lbs	60 NM	High Subsonic	Active Terminal/ Radar Homing	1985
AGM-84E SLAM/ SLAM-ER	Precision Land Attack Cruise Missile	488 lbs	60 NM/ 150 NM	High Subsonic	Inertial Navigation with GPS/ Infrared Terminal Guidance	1993
AGM-65 <i>Maverick</i> (Replacing the AGM-62 <i>Walleye</i>)	Close-air support/ interdiction/ defense suppression	300 lbs	17 NM	Classified	Electro-optical/ Infrared/ Laser Guided	1972
AGM-88 <i>HARM</i> (Replacing the AGM-45 <i>Shrike</i>)	Anti-Radiation Missile	150 lbs	80 NM	760 mph	Radar Homing	1985

TableA-3. Anti-ship and Air to Ground Missiles of the Carrier Tactical Aviation Wing
(Source: Derived from "Navy Fact File," *United States Navy Website* and Norman Polmar, *The Ships and Aircraft of the U.S. Fleet* 14th ed.)

C. LAND BASED AVIATION

1. Undersea Warfare and Anti-Surface Aircraft

The land based Undersea Warfare and Anti-Surface aircraft in the United States Navy arsenal is the P-3C *Orion*. The *Orion* is powered by four turboprop engines that give its twelve man crew an endurance of fourteen hours at speeds of up to 405 knots. In order to detect surface ships and submarines, the P-3C has the APS-115 I-Band radar, the Directional Frequency and Ranging Sonobuoys, and the Magnetic Anomaly Detection System. The P-3C is armed with up to 20,000 lbs of MK-46 torpedoes, the AGM-84D Harpoon missiles, AGM-

65 Maverick Guided Missiles, depth charges, and mines. The P-3C *Orion* was first deployed in 1969.

2. Airborne Command Post

The airborne command post for the nation's military is the Navy's E-6A *Mercury* aircraft. The mission of these airborne command posts is to provide secure, survivable, jam resistant strategic communications relay for fleet ballistic missile submarines and other parts of the nation's strategic nuclear forces. The aircraft is a converted commercial Boeing 707 with a low frequency communications system and wire antenna several thousand feet long that is winched in and out of the aircraft. The aircraft has a range of 6,600 nautical miles with a loiter time of six hours. The E-6A was first accepted in 1989.

3. Logistic Aircraft

The fixed wing logistics aircraft of the Navy are the C-2A *Greyhound*, the C-130 *Hercules*, and the C-9 *Skytrain*. The C-2A is a two engine carrier capable logistics aircraft while the C-130 is one of the most widely flown military transports. The C-9 is the military version of the commercial DC-9 and is largely used for personnel transport.

D. ROTARY WING AIRCRAFT

1. Ship Based Helicopters

The primary helicopter of the force is the SH-60 *Seahawk*. The *Seahawk* is a twin-engine helicopter with a crew of three which is used for undersea warfare, search and rescue, drug interdiction, anti-surface warfare, cargo lift, and special operations. The SH-60B is operated from cruisers, destroyers, and frigates while the SH-60F is carrier based. The top speed of the *Seahawk* is 180 knots and it has a range of about 380 nautical miles. The *Seahawk* can be equipped to carry three MK-46 torpedoes and is usually outfitted with two 7.62 mm machine guns in the windows. The SH-60 was first received in 1983. The other two multi-purpose helicopters in the fleet are the SH-2G *Seasprite* with a crew of three and the H-3H *Sea King* with a crew of four. The *Seasprite* is typically deployed on a surface combatant and is used in undersea warfare, anti-surface warfare, and over-the-horizon targeting role while the

Sea King is used for helicopter combat recovery, utility and torpedo recovery, carrier based undersea warfare, and search and rescue. The top speed of the *Seasprite* is 150 knots while the top speed of the *Sea King* is 136 mph. The range of the two helicopters is 340 nautical miles and 542 nautical miles, respectively. Both helicopters can be armed with two MK-46 torpedoes. The SH-2 was first operational in 1962 while the H-3H was first operational in 1961.

As previously mentioned, the primary weapon of the Navy's helicopters is the MK-46 torpedo. The MK-46 is an air and ship launched light weight torpedo with an active or passive acoustic homing system. The torpedo has range of 8,000 yards at speeds greater than 28 knots. It is armed with a 98 lbs high explosive warhead. The Mk-46 is slowly being replaced by the MK-50 light weight torpedo. The MK-50 has an active or passive homing system and can travel faster than 40 knots. The range of the MK-50 is currently classified. In addition to torpedoes, naval helicopters can be equipped with the *Penguin* Anti-ship missile. The *Penguin* is an inertial and infrared guided missile with a range of 21.7 nautical miles at speeds of up to Mach 1.2. The warhead on the *Penguin* is 265 lbs of semi-armor piercing explosive. The *Penguin* was deployed in 1993.

2. Mine countermeasure Helicopters

The MH-53E *Sea Dragon* is the Navy's airborne mine countermeasure platform with the capability of pulling the MK 105 minesweeping sled and the MK 103 minesweeping system. In addition to mineclearing, the *Sea Dragon* can be used to carry a payloads of up to 10 tons. The three engine MH-53E has a range of 1,120 nautical miles at speeds up to 150 knots. The *Sea Dragon* was first deployed in 1983.

3. Logistics Helicopters

The logistics helicopter of the fleet is still the four man CH-46 D/E *Sea Knight*. The *Sea Knight* is typically used in the vertical replenishment role but can be used for delivery of personnel. The helicopter has two rotors with two engines that give the aircraft a ferry range of 600 nautical miles at speeds of up to 145 knots. The *Sea Knight* was first received by the Navy in 1961.

E. SURFACE SHIPS

1. Combatants

Surface combatants are broken down by size and mission into three categories: cruisers, destroyers, and frigates. Cruisers and destroyers are multi-mission combatants that perform the traditional roles of anti-air warfare, anti-surface warfare, strike warfare, and undersea warfare. Frigates are smaller and are usually relegated to primarily undersea warfare.

Currently, the Navy has three types of cruisers: the *Ticonderoga* Class, the *Virginia* Class, and the *California* Class. The *Ticonderoga* Class is powered by four gas turbine engines while the *Virginia* and *California* Classes are powered by two water cooled nuclear reactors. All three classes can go in excess of 30 knots. Additionally, the *Ticonderoga* Class cruisers are coupled with the AEGIS combat system. The AEGIS combat system is an advanced, automatic detection and tracking, multi-function phased array radar with the ability to track over 100 targets. It is the center of the Battlegroups anti-air capability. The armament on the cruisers is summarized in Table A-4.

Cruiser Armament				
Class	Missile Launcher	Missiles	Guns	Torpedoes
<i>Ticonderoga</i> (CG47-CG51)	MK26 Twin Rail Missile Launcher	<i>Standard</i> <i>ASROC</i> <i>Tomahawk</i>	2 MK 45 5" Guns 2 <i>Phalanx</i> CIWS	6 MK46 Torpedoes
<i>Ticonderoga</i> (CG52-CG73)	MK41 Vertical Launching System	<i>Standard</i> <i>ASROC</i> <i>Tomahawk</i>	2 MK 45 5" Guns 2 <i>Phalanx</i> CIWS	6 MK46 Torpedoes
<i>Virginia</i>	MK26 Twin Rail Missile Launcher MK141 Harpoon Missile Launcher Mk143 Armored Box Launchers	<i>Standard</i> <i>ASROC</i> <i>Harpoon</i> <i>Tomahawk</i>	2 MK 45 5" Guns 2 <i>Phalanx</i> CIWS	6 MK46 Torpedoes
<i>California</i>	MK26 Twin Rail Missile Launcher MK141 Harpoon Missile Launcher Mk143 Armored Box Launchers MK16 Box Launcher	<i>Standard</i> <i>Harpoon</i> <i>Tomahawk</i> <i>ASROC</i>	2 MK 45 5" Guns 2 <i>Phalanx</i> CIWS	4 MK46 Torpedoes

Table A-4: Cruiser Armament (Source: Derived from "Navy Fact File," *United States Navy Website* and Norman Polmar, *The Ships and Aircraft of the U.S. Fleet* 14th ed.)

The *Ticonderoga* was first deployed in 1983 while the *Virginia* and the *California* were first deployed in 1976 and 1974, respectively.

In addition to cruisers, the Navy currently has three classes of destroyers: the *Arleigh Burke* Class, the *Kidd* Class and the *Spruance* Class. The *Arleigh Burke* Class is a guided missile destroyer with the AEGIS combat system similar to the *Ticonderoga* Class cruiser. All three classes are powered by gas turbine engines that can sustain speeds of greater than 30 knots. The *Arleigh Burke* differs in armament from the *Ticonderoga* class in that it has fewer

vertical launch cells and it has only one 5" gun. Several of the *Spruances* have been backfitted with a vertical launch system but some only have a *Sea Sparrow* Box Launcher. For *Spruances* without the vertical launch system, *Tomahawk* armored box launchers have been installed to give the destroyer a strike capability. The *Kidd* Class is equipped with MK26 twin rail missile launchers like the early *Ticonderoga* Class cruisers. In addition all three destroyers are equipped with the *Harpoon* missile quad launchers. The *Arleigh Burke* was first deployed in 1991 while the *Kidd* and the *Spruance* were first deployed in 1981 and 1975, respectively.

The sole frigate of the Navy is the *Oliver Hazard Perry* Class and this platform is being phased out due to its limited capabilities. The FFG's are powered by two gas turbine engines that can propel the class at speeds up to 29 knots. The *Perry* Class has some anti-air capability with the MK13 single rail missile launcher, but it has predominantly been used in the undersea warfare role. In addition to the MK13, the *Perry* Class is armed with the 76 mm *oto melera* rapid fire gun, four *Harpoon* missiles, one *Phalanx* CIWS, and six MK46 torpedoes. The first *Perry* Class was deployed in 1977.

The combatants of the Navy are currently armed with precision guided munitions and more conventional naval guns. Table A-5 summarizes the capabilities of current surface ship weapons.

Weapons of the Surface Fleet						
Weapons System	Primary Function	Warhead	Range	Speed/Rate of Fire	Guidance	Date Deployed
BGM-109 Tomahawk	Land Attack and Anti-ship Cruise Missile	1,000 lbs of High Explosives or a Submunitions Dispenser	870 NM	550 MPH	Inertial, TERCOM, DSMAC, GPS for Block III	1986 1995 for Block III
BGM-84D Harpoon	Anti-ship	488 lbs	60 NM	High Subsonic	Active/Terminal Radar Homing	1985
SM-1/2 MR Standard Missile	Medium range Surface to Air	High Explosive	15-20 NM/ 40-90 NM	Super-sonic	Semi-Active Radar Homing	1970 (SM-1MR) 1981 (SM-2MR)
SM-1/2 ER Standard Missile	Long Range Surface to Air	High Explosive	65-100 NM	Super-sonic	Inertial/Semi-Active Radar Homing	1981
RUR-5A ASROC	Undersea Warfare Missile/Torpedo	MK 46 Torpedo	6 NM	40 knots	Active/Passive Acoustic Homing	1961

Table A-5. Weapons of the Surface Fleet (Source: Derived from "Navy Fact File," *United States Navy Website* and Norman Polmar, *The Ships and Aircraft of the U.S. Fleet* 14th ed.)

Weapons of the Surface Fleet (CONT)						
Weapons System	Primary Function	Warhead	Range	Speed/ Rate of Fire	Guidance	Date Deployed
MK45 5" Gun	Naval Gunfire	5" shells	13 NM	16-20 Rounds per Minute	N/A	1971
MK75 76mm Oto Melera	Naval Gunfire	76mm shells	10 NM	80 Rounds per Minute	N/A	1978
Phalanx CIWS	Terminal Anti-Air Defense	20 mm APDS shells ¹⁵⁶	Classified	3,000 to 4,500 Rounds per Minute	N/A	1980
MK38 25 mm Machine Gun	Heavy Machine Gun	25 mm shells	2700 yards	175 Rounds per Minute	N/A	1986

Table A-5. Weapons of the Surface Fleet (CONT) (Source: Derived from "Navy Fact File," *United States Navy Website* and Norman Polmar, *The Ships and Aircraft of the U.S. Fleet* 14th ed.)

2. Amphibious Ships

Amphibious Ships come in three major categories: Amphibious Assault ships, Amphibious Transport Docks, and Dock Landing Ships. The Amphibious Assault ships are further subdivided into LHA's, LHD's, and LPH's. These ships are primary landing ships and resemble small aircraft carriers. Their primary function is to put troops ashore with Landing Craft Air Cushion (LCAC) vehicles and support them with Marine AV-8B *Harrier* VSTOL (Vertical and Short Take Off and Landing) aircraft and Marine combat helicopters. These ships can also perform sea control and limited power projection missions. There are three classes that are in this category; the *Wasp* which was first deployed in 1989, the *Tarawa* which was first

¹⁵⁶ APDS is the abbreviation for Armor Piercing Discarding Sabot shells.

deployed in 1976, and the *Iwo Jima* which was first deployed in 1961. All three class are powered by boilers and are capable of speeds greater than 20 knots.

The next category of amphibious ships is Amphibious Transport Docks or LPD's. The current LPD's are of the *Austin* Class. The *Austin* Class is powered by two boilers which give it speeds greater than 20 knots in the mission of Marine transport. LPD's can carry landing craft, amphibious assault vehicles, and helicopters along with a Marine detachment of 700 to 900 troops. The *Austin* class was first deployed in 1965 and is being replaced by the *San Antonio* Class.

The final category is Dock Landing Ships (LSD). There are three classes of LSD's: the *Harpers Ferry* Class, the *Whidbey Island* Class, and the *Anchorage* Class. The newer *Harpers Ferry* Class and the *Whidbey Island* class are diesel powered and are capable of speeds greater than 20 knots while the *Anchorage* Class is powered by boilers and is capable of going 22 knots. The LSD's mission is to support amphibious operations by transporting LCACs, conventional landing craft, and helicopters onto hostile shores. The *Harpers Ferry* is capable of carrying two LCACs while the *Whidbey Island* Class and the *Anchorage* Class are capable of carrying four. The Marine detachment on the ships varies from 330 Marines to 402 Marines with the capability of a surge of 102 more. The ships are armed with mix of MK38 Machine guns, .50 cal. machine guns, *Phalanx* CIWS and for the *Anchorage* Class a 3" twin barrel gun. The *Harpers Ferry* Class was first deployed in 1995 while the *Whidbey Island* and *Anchorage* Classes were first deployed in 1985 and 1969, respectively.

The Navy has two major types of landing craft: the Landing Craft, Air Cushioned Vehicle (LCAC) and the Landing Craft, Mechanized/Utility Vehicle (LCM/LCU). The LCAC is an air cushioned vehicle that is powered by four gas turbines: two for propulsion and two for lift. The gas turbines give the LCAC a range of 200 miles at 40 knots with a payload. The LCAC can carry 60 to 75 tons of payload which includes 24 troops or one main battle tank. The advantage of the LCAC over the LCM/LCU is that can reach 70% of the world's coastline while the LCM/LCU can only reach 15%. The LCM/LCU is a more conventional landing craft of World War II vintage. These craft are diesel powered and can reach speeds of 9 to 12 knots.

They can carry anywhere from 34 tons in the LCM-6 to 180 tons in the LCM-8. The LCAC was first deployed in 1982 while the newest of the LCM/LCU type was first deployed in 1959.

3. Command Ships and Amphibious Command Ships

The Navy currently has four Command ships/ Amphibious Command ships. These ships serve as the flagships of the four operational fleets. The two Command ships are converted LPDs while the two Amphibious Command ships were originally designed for this function. All the ships in this category are boiler powered and are capable of speeds greater than 20 knots. The distinguishing feature of these ships is their C4ISR systems. The *La Salle* Command ship was commissioned in 1964 while the remaining three ships were commissioned in 1970 and 1971.

4. Mine Countermeasure Ships

In addition to the MH-53E, the Navy has several surface ships that fulfill the mine countermeasure role. The biggest of these ships is the Mine Countermeasure Ship (MCS) *Inchon*. The MCS's mission is to provide dedicated command, control, and support for mine countermeasure operation. The *Inchon* is a converted amphibious assault ship that now houses eight MH-53E helicopters and four MCM/MHC small mine countermeasure ships of the Avenger and Osprey Classes. The *Inchon* was first deployed in 1970.

The *Avenger* Class mine countermeasure ships (MCM) are designed as mine-hunter killers capable of finding, classifying, and destroying moored and bottom mines. It is powered by four diesels and is capable of 14 knots. The MCM is manned with 84 officers and enlisted personnel. The smaller *Osprey* Class Minehunter Coastal (MHC) is manned with 51 officers and enlisted. The *Osprey* has some of the same capabilities of the larger Avenger but is much more limited in endurance. It has only two diesels that make it capable of 10 knots. Both ships typically operate in conjunction with a larger task force usually with the MCS *Inchon*. The Avenger was first deployed in 1987 and the Osprey was first deployed in 1993.

5. Brown Water Combatants

The Navy's coastal and riverine warfare capability centers around the Cyclone Class Patrol Craft (PC) and the MK5 Special Operations Craft. The Cyclone was designed for

coastal patrol and interdiction surveillance. These ships can also provide full mission support for SEAL and other special operations force missions. The PC is powered by four diesels and go in excess of 35 knots. It is armed with two MK38 machine guns, two .50 caliber machine guns, two grenade launchers, and six Stinger surface to air missiles. The MK5 Special Operations Craft is used to transport special operations forces into and out of areas where the threat is considered low to medium. The MK5 is capable of 50 knots.

6. Auxiliary/ Logistics Support Ships

The Navy operates 5 major categories of support ships. The Navy operates fleet oilers in the Cimarron Class, Kilauea Class ammunition ships, Fast Combat Support Ships of the Sacramento Class, Salvage Ships of the Safeguard Class, and Submarine Tenders of the Simon Lake Class and Emory S. Land Class. These ships fulfill missions of underway replenishment, salvage, and maintenance.

F. SUBMARINES

1. Fast Attack Submarines

Fast Attack Submarines (SSN) are the Navy's original stealth platform. They are capable of performing strike warfare, anti-surface warfare, undersea warfare, SEAL and special operation force insertion, mine warfare, and intelligence gathering. There are five classes of Fast Attack Submarines ranging from the newest *Sea Wolf* Class to the older *Sturgeon* and *Benjamin Franklin* Classes. The most common fast attack submarine is the *Los Angeles* Class. All of these submarines are powered by water cooled nuclear reactors and are capable of speeds in excess of 20 knots at depths greater than 400 feet. Fast Attack Submarines are armed with *Tomahawk* missiles, *Harpoon* missiles, the MK48 ADCAP (Advanced Capabilities) torpedo, the MK48 torpedo, and are capable of laying mines. The *Sea Wolf* underwent sea trials in 1996 while the *Los Angeles* Class, the *Narwhal* Class, the *Sturgeon* Class, and the *Benjamin Franklin* Class were first deployed in 1976, 1969, 1967, and 1965, respectively.

The most common submarine weapon is the MK48 ADCAP and MK48 torpedo. The ADCAP torpedo is a heavy weight torpedo used in undersea and anti-surface warfare. It has a

range of greater than 5 miles at speeds greater than 28 knots. It is wire guided with passive or active acoustic homing. It has a warhead of 650 lbs of high explosive which is designed to break the keel of surface ships. The MK48 was first deployed in 1972.

2. Ballistic Missile Submarines

The strategic deterrence platform of the Navy is the Ohio Class fleet ballistic missile submarine (SSBN). The Ohio Class provides the sea "leg" of the triad of U.S. strategic offensive forces. It carries 24 Trident C-4 or D-5 Fleet Ballistic Missiles. Like the fast attack submarines, the Ohio Class is powered by a water cooled nuclear reactor which makes it capable of speeds greater than 20 knots at depths greater than 400 feet. It was first deployed in 1981.

The Trident Fleet Ballistic Missile is the Navy's Intercontinental Ballistic Missile. It is a three stage, solid propellant, inertially guided missile with a range of more than 4,000 nautical miles. It is outfitted with Multiple Independently Targetable Re-entry Vehicles and Maneuverable Re-entry Vehicles with each vehicle having a nuclear warhead worth many megatons worth of TNT. The C-4 variant was first deployed in 1979 and the D-5 variant was first deployed in 1990.

G. C4ISR SYSTEMS: THE BIRTH OF NETWORK CENTRIC WARFARE

The Navy's C4ISR system is currently being designed around "Network Centric Warfare." The goal of "Network Centric Warfare" is to tie the shooter to the sensor in an easy-to-manipulate information grid in order to create speedy and efficient command and control. The "Network Centric" C4ISR system is comprised of three systems: (1) the Global Command and Control System (GCCS), (2) the Joint Tactical Information Distribution System (JTIDS), and the Co-operative Engagement Capability System (CEC).¹⁵⁷

GCCS is the key command, control, communications, computers, and intelligence system in the "C4I for the Warrior" concept. It provides a fused picture of the battlespace by incorporating core planning and assessment tools into a client-server computer architecture.

GCCS is basically an intranet for the military, but it also includes capabilities for near continuous voice, video, data, text, graphics, and imagery. The two aspects of GCCS that "Network Centric Warfare" will use the most is the Joint Maritime Command Information System (JMCIS)/ Common Operating Environment (COE) and the Joint Defense Intelligence Support System (JDISS). JMCIS provides a single integrated command, control, information system that receives, processes, displays, and maintains geolocation on friendly, hostile, and neutral land, sea, and air forces. JMCIS is the descendent of the Navy's Joint Operational Tactical System (JOTS), the Naval Computer and Telecommunications System (NTCS), and the Naval Tactical Data System (NTDS). JDISS is a software application that gives intelligence analysts access to a wide number of intelligence databases and the ability to perform independent multi-disciplined intelligence analysis in the field. JDISS allows images to be received, transmitted, and manipulated. GCCS with JMCIS and JDISS is designed to provide force coordination capability for the joint force commander to include predictive planning and preemption, integrated force management, and execution of time-critical missions for thousands of military users.¹⁵⁸

JTIDS or Link-16 is a high-capacity digital information system that provides rapid, secure, jam-resistant/ frequency hopping communications, navigation, and identification capabilities for force control. Its the data circuit with a "big enough pipe" to enable the huge volumes of data that will flow when "Network Centric Warfare" is fully developed. JTIDS is the descendent of Link-11, but unlike Link-11 which was limited to a transmission rate of 5 kbps, Link-16 will have the capability of at least 64 kbps which will allow for increased range and track capability, multi-source identification, up-to-date digital maps, and embedded training. Link 16 is designed to handle about 250 military users.¹⁵⁹

¹⁵⁷ Cebrowski and Gartska, pp. 29-35.

¹⁵⁸ Scott C. Truver, "Harnessing the C4ISR Revolution," *Jane's Navy International* (October 1997): pp. 31-35, Department of Defense, *C4I Handbook for Integrated Planning*, (1996), pp. 7-44 - 7-54, and Archie Clemens, Commander in Chief Pacific Fleet, speech to AFCEA West '98 Conference, January 15, 1998.

¹⁵⁹ Scott C. Truver, "Harnessing the C4ISR Revolution," *Jane's Navy International* (October 1997), p. 35, and Archie Clemens, Commander in Chief Pacific Fleet, speech to AFCEA West '98 Conference, January 15, 1998.

The third and final leg of this network architecture is the CEC. CEC integrates the sensor data of each ship and aircraft into a single, real-time, fire control quality composite track picture. It also provides interfaces with the weapon systems of each CEC-equipped ship in the battlegroup to allow for integrated engagement capability i.e. the control ship can shoot another ships missiles when the system is in "automatic." In essence, CEC extends the range at which a ship can engage hostile missiles well beyond the ships own radar horizon. The system was originally designed to counter cruise missiles, but has been extended to combat theater ballistic missile defense and the Naval Surface Fire Support concept called the "Ring of Fire." As currently designed, CEC will be able to provide weapons control capabilities for approximately 40 military users.¹⁶⁰

The constraint on "Network Centric Warfare" has been and will continue at least for the near future to be bandwidth. With Link-11 and the Naval Tactical Data System which has been in use since the 1960's, the bandwidth has ranged from 600 to 5000 bps. The problem is that primary imagery requires 768 Kbps and video Tele-conferencing requires at least 128 Kbps. The technology limitation for the Navy with these data flow rates is the size of the antenna. Few surface ships and submarines can sport an antenna designed for these data flow rates. Challenge Athena was the Navy's attempt to get high bandwidth satellite communications to Joint Task Force command capable ships e.g. carriers, air-capable amphibious assault ships, and command ships. It provides a data flow rate of 1.544 Mbps with commercial of the shelf technology. The problem with Challenge Athena is the preclusive size of it antenna for smaller combatants.

The Navy's current answer to this dilemma is ATM or Asynchronous Transfer Mode. ATM is essentially a push-pull system of data flow. A small combatant will transmit small requests for information and will receive large influxes of data or the large amounts of data will be pushed without the small combatant having to ask for it. Consequently, the smaller combatants do not require the use of large satellite antennas with which to transmit requests.

¹⁶⁰ *Ibid.*

All that is required is a relatively small INMARSAT B (International Maritime Satellite) receiver capable of 64 Kbps as a part of Link 16 initiative.

In addition, the smaller combatants will be able to receive line of sight broadcasts of up to 512 Kbps from the flagship using the Digital Wide Band Transmission System (DWTS). DWTS will allow the flagship to disseminate material derived from GCCS to the smaller combatants thus vastly improving connectivity within the battlegroup. Smaller combatants will finally be able to participate in collaborative planning with DWTS.¹⁶¹

¹⁶¹ Archie Clemens, Commander in Chief Pacific Fleet, speech to AFCEA West '98 Conference, January 15, 1998.

APPENDIX B: OFFICER CAREER PATHS

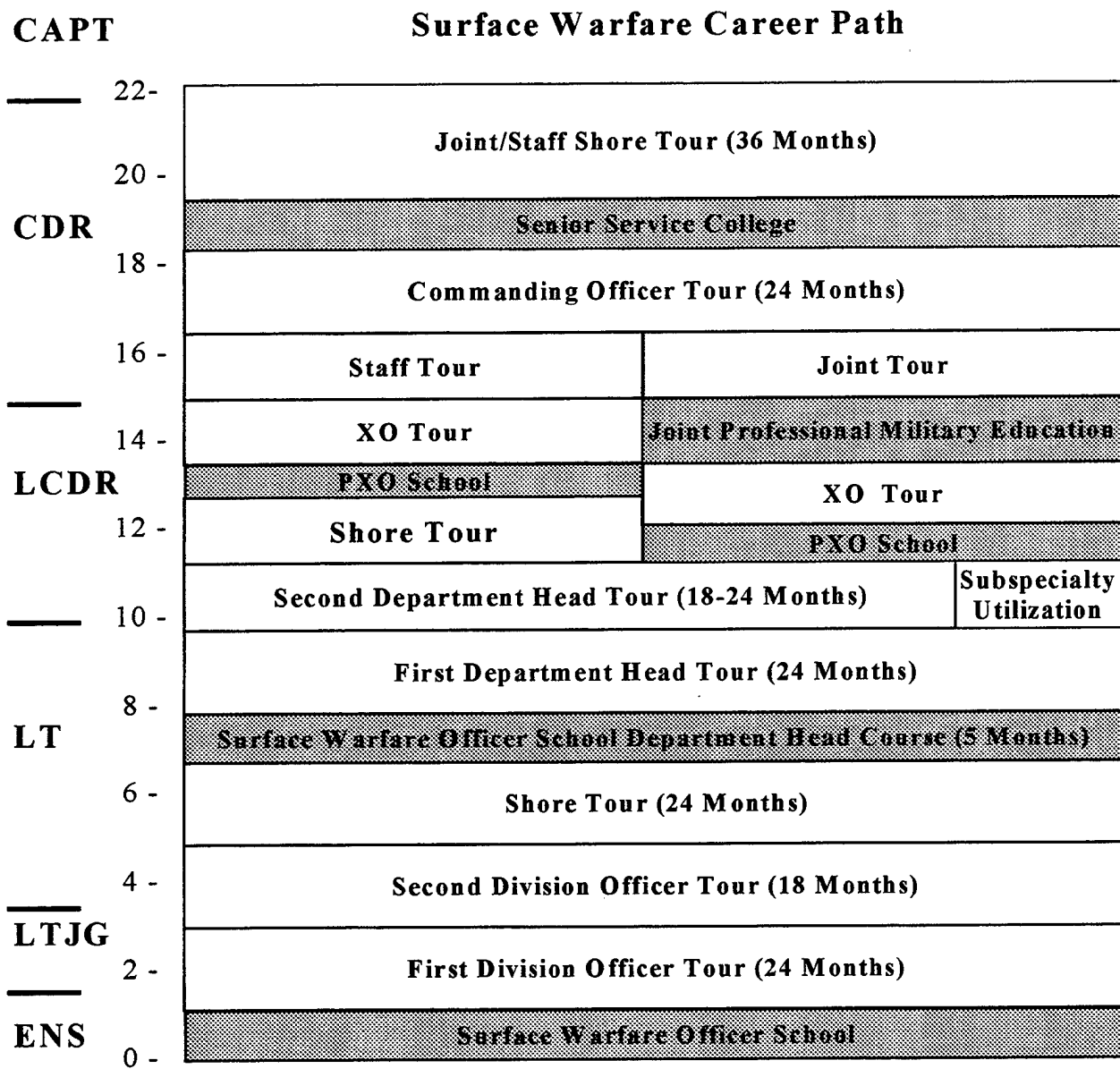


Figure B-1. Surface Officer Career Path (Source: Navy Bureau of Personnel Perspective, Jan-Feb. 1998)

Submarine Warfare Career Path

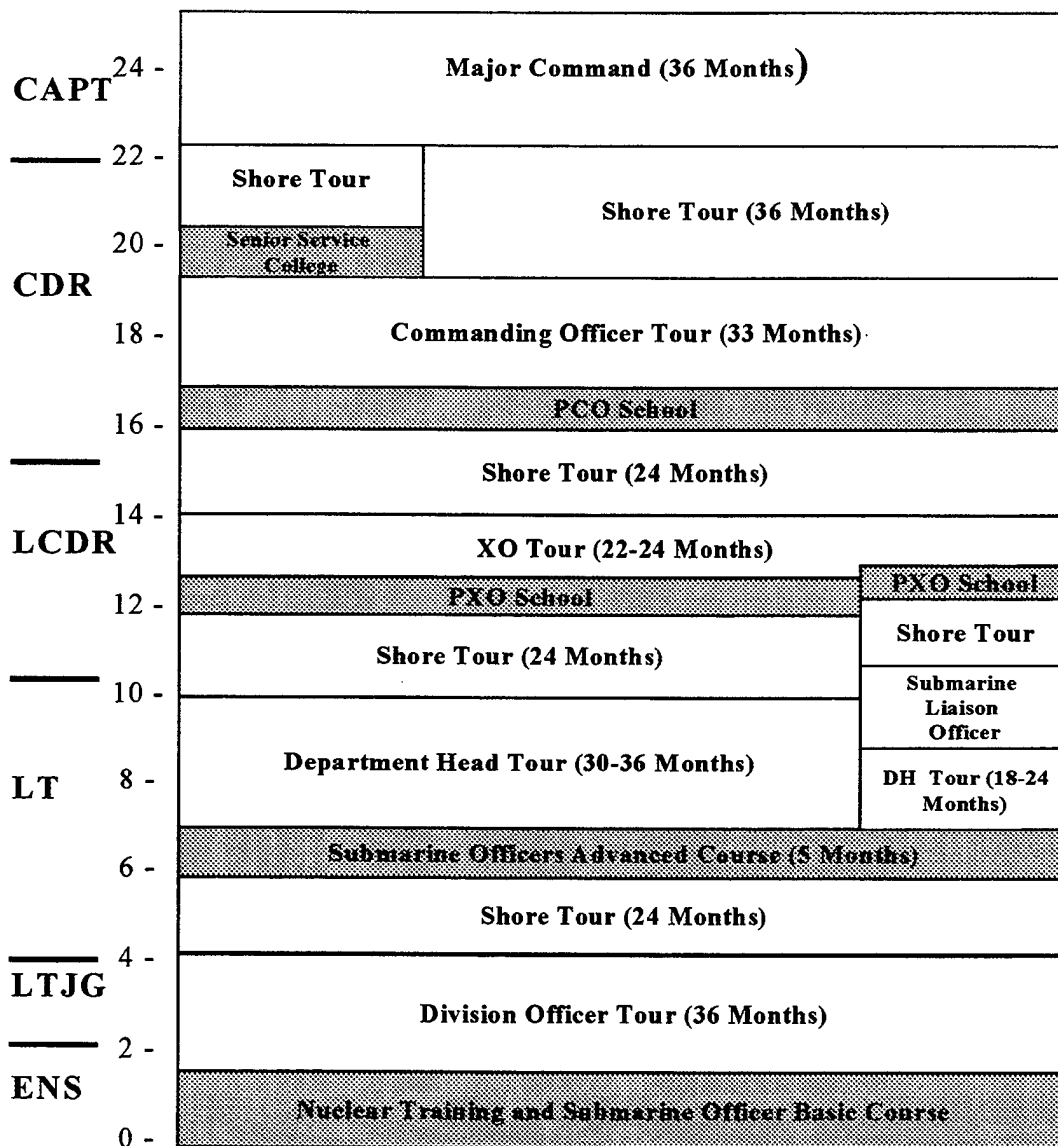


Figure B-2. Submarine Officer Career Path (Source: Navy Bureau of Personnel Perspective, Jan-Feb. 1998)

Aviation Officer Career Path

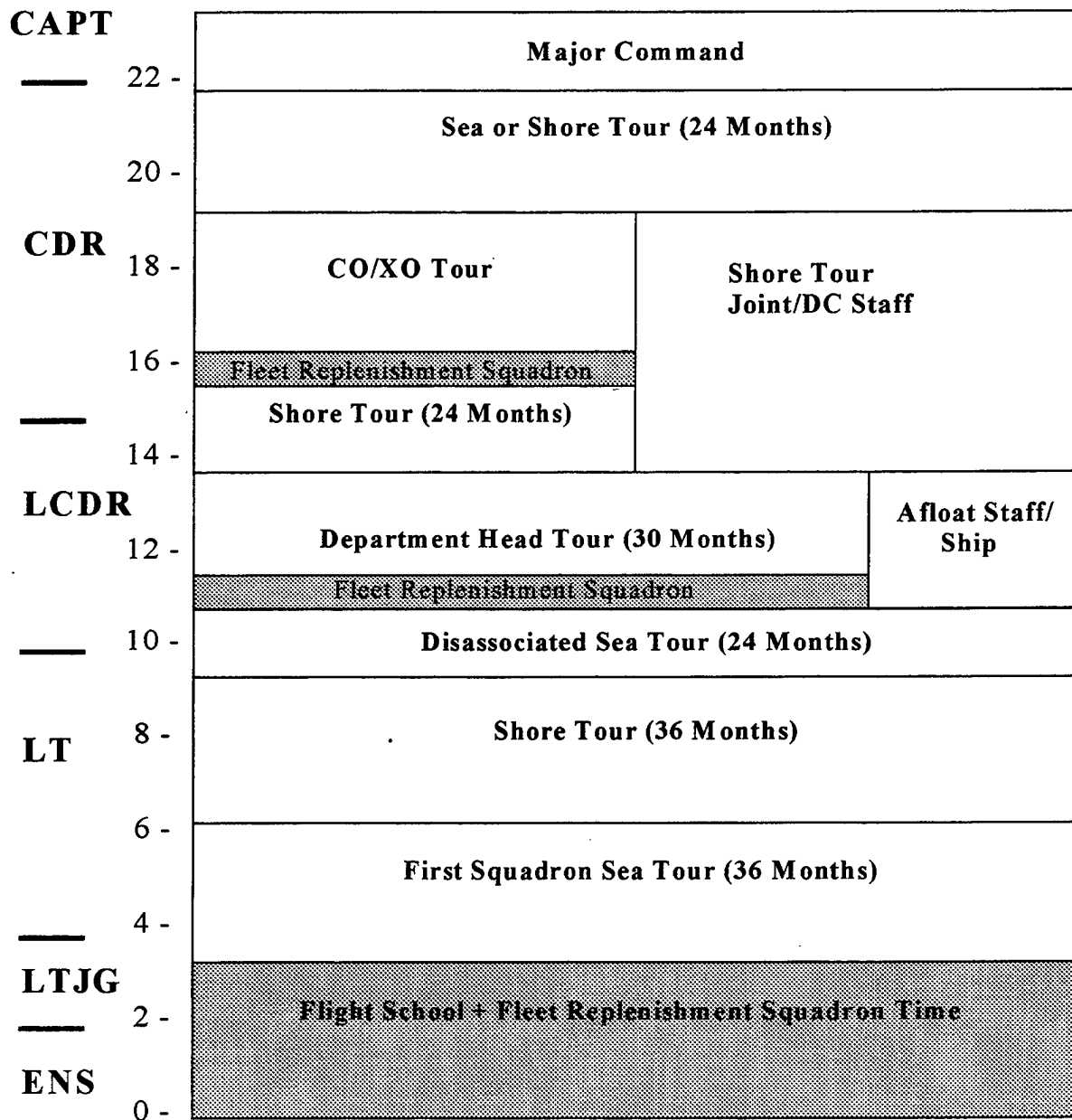


Figure B-3. Aviation Officer Career Path (Source: Navy Bureau of Personnel Perspective, Jan-Feb. 1998)

Special Warfare Officer Career Path

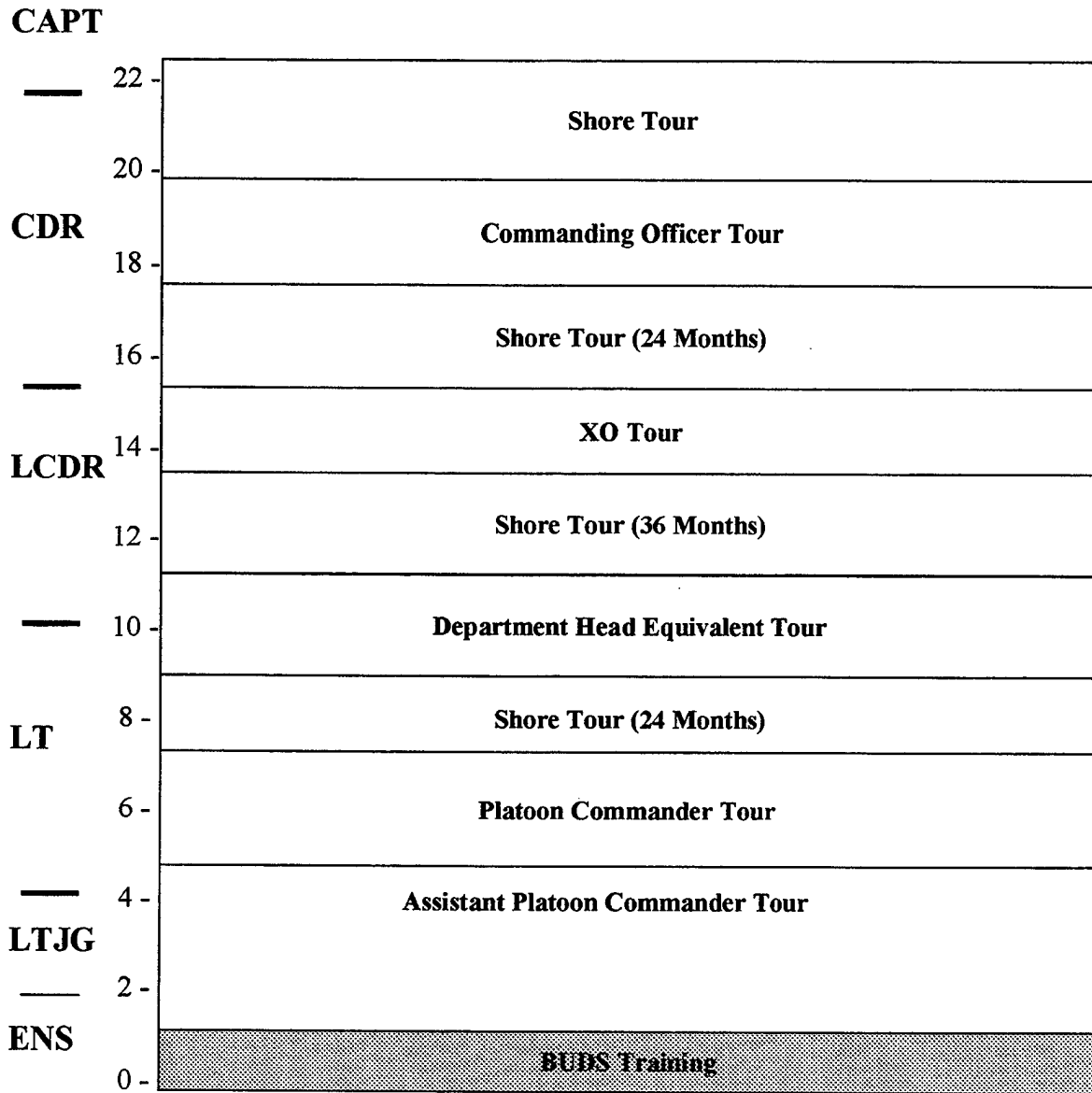


Figure B-4. Special Warfare Officer Career Path (Source: The Naval Officer Planning Guidebook, 1990)

Special Operations Officer Career Path

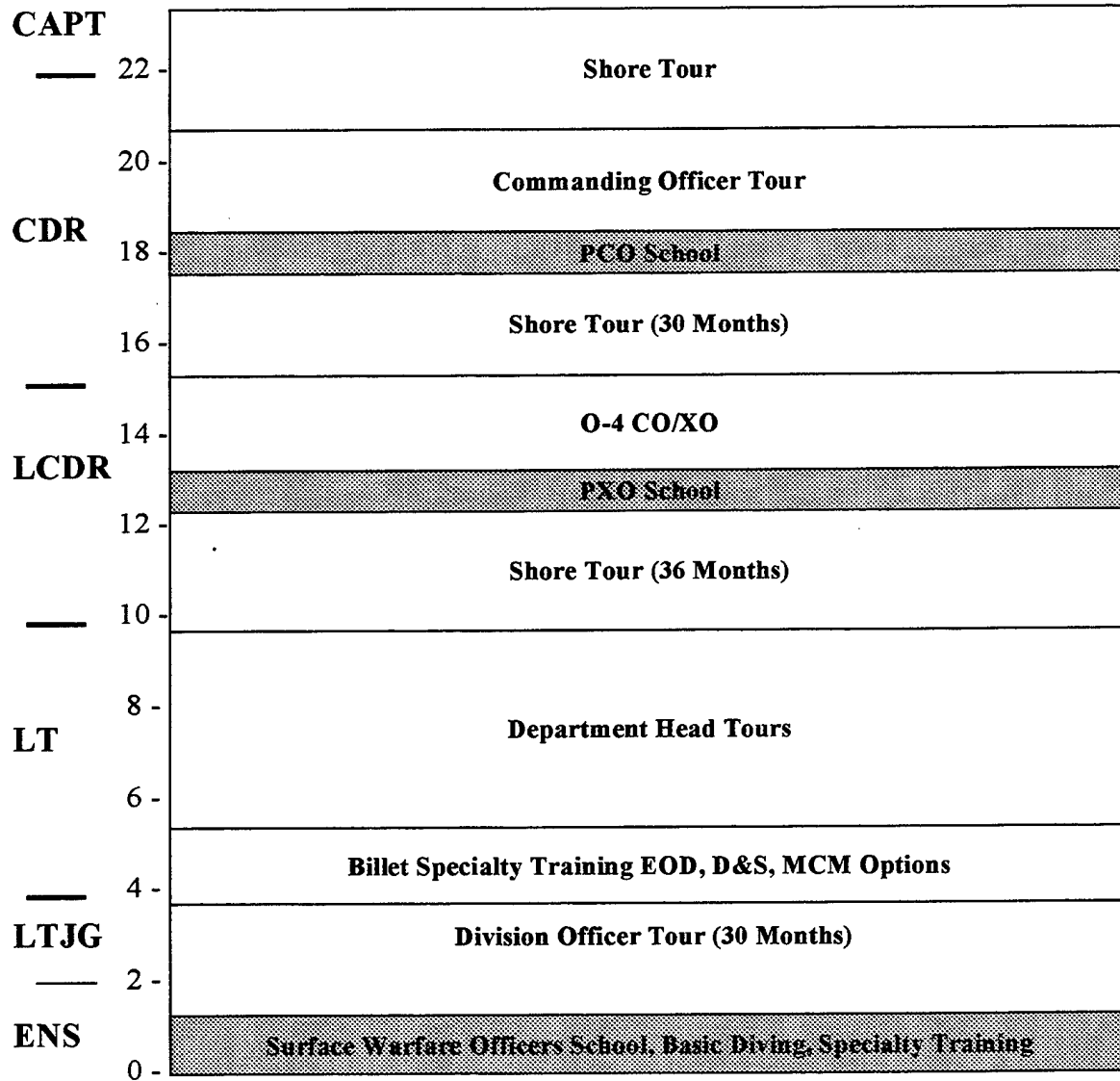


Figure B-5. Special Operations Officer Career Path (Source: The Naval Officer Planning Guidebook, 1990)

Engineering Duty Officer Career Path

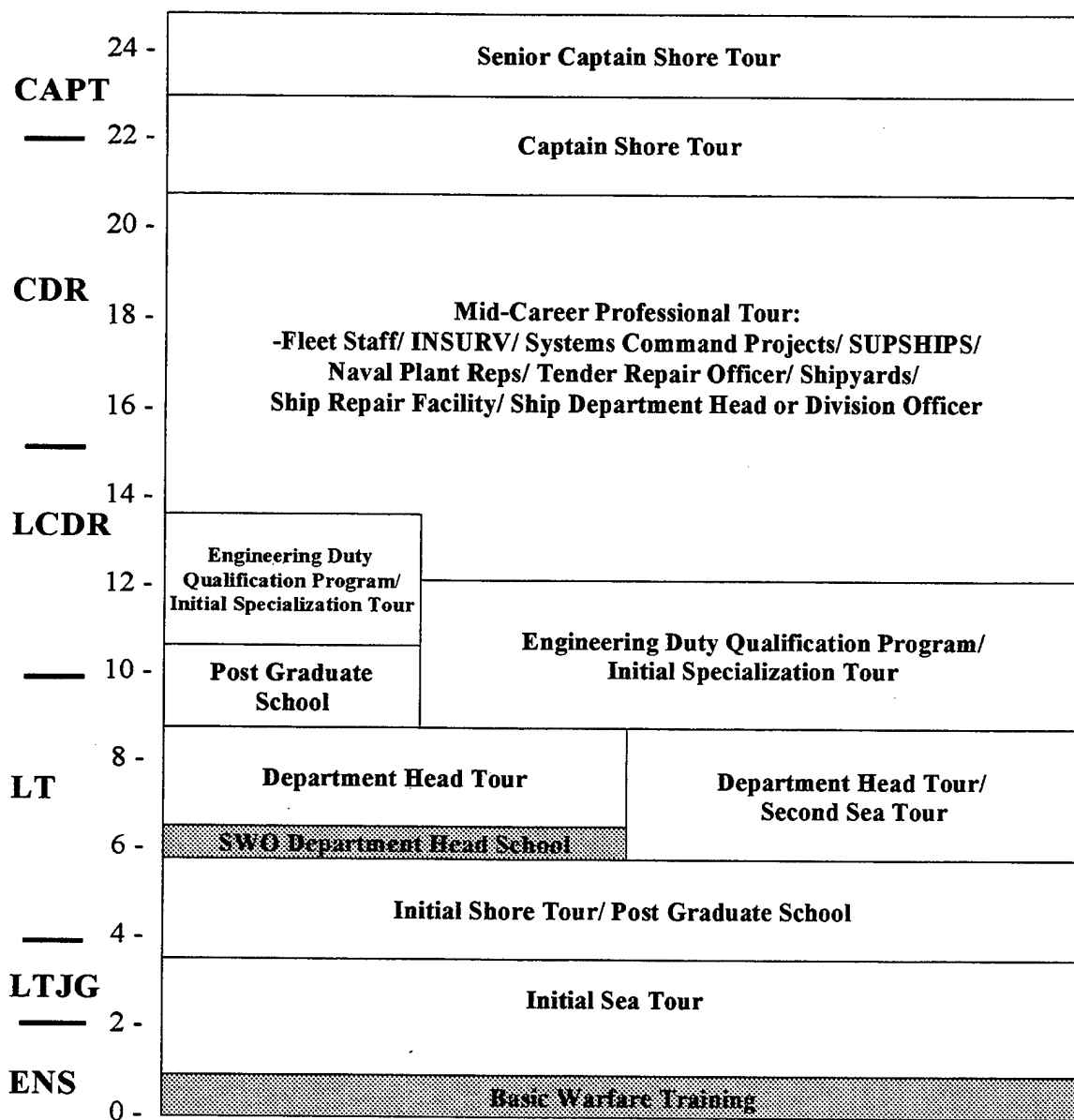


Figure B-6. Engineering Duty Officer Career Path (Source: The Naval Officer Planning Guidebook, 1990)

Intelligence Officer Career Path

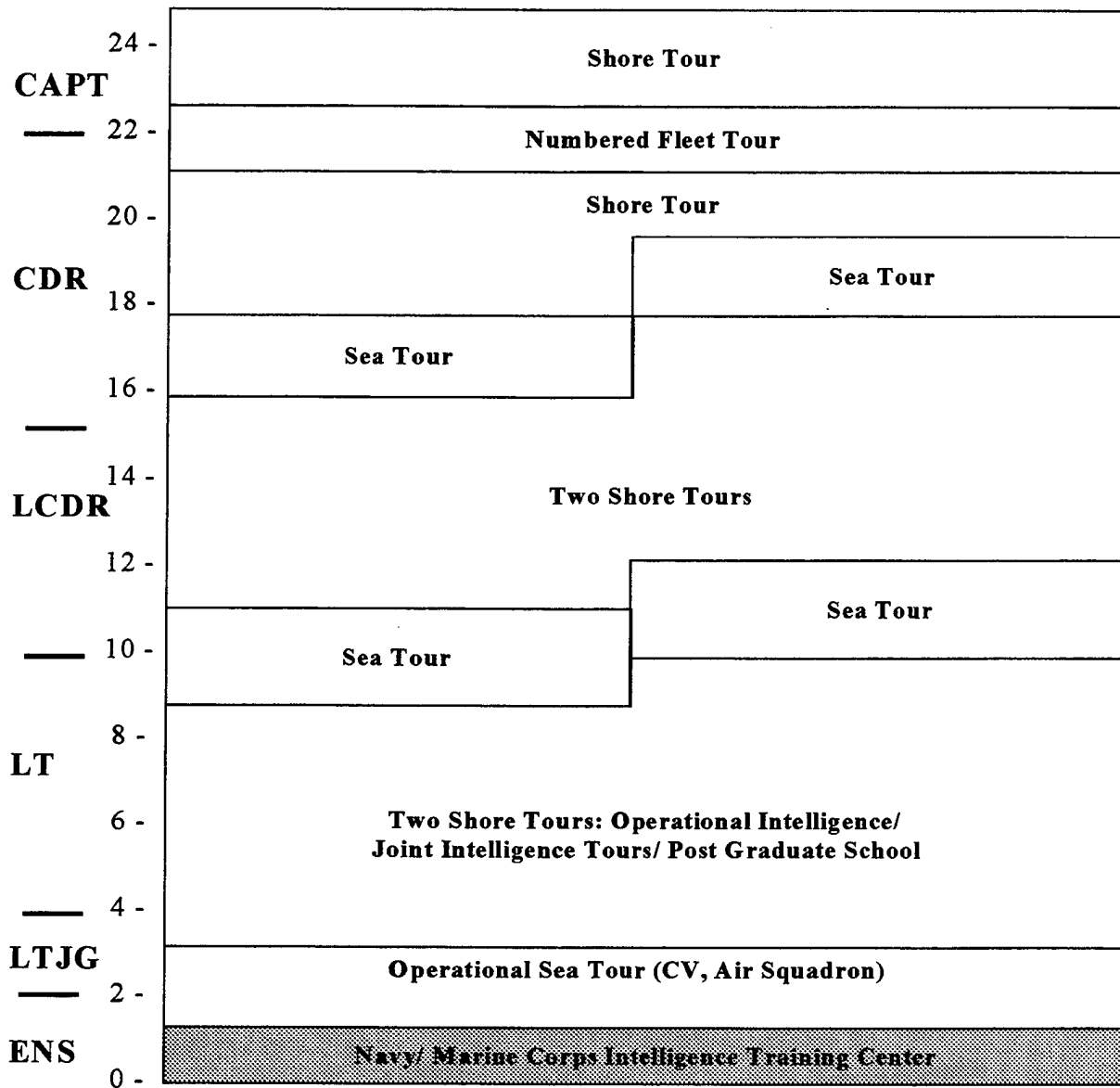


Figure B-7. Intelligence Officer Career Path (Source: The Naval Officer Planning Guidebook, 1990)

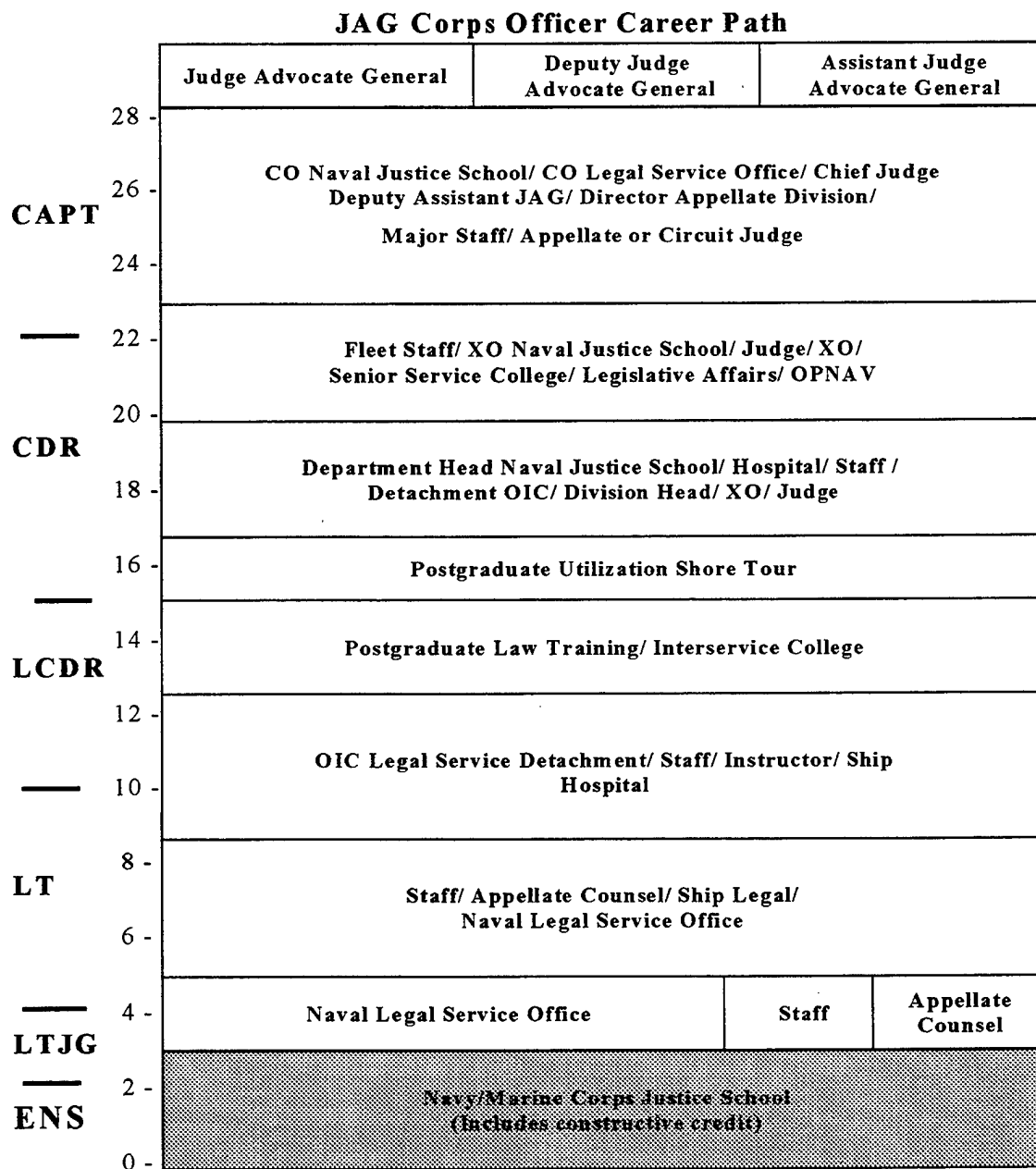


Figure B-8. JAG Corps Officer Career Path (Source: The Naval Officer Planning Guidebook, 1990)

Civil Engineer Corps Officer Career Path

CAPT	26 -	Com- mand & Adv- anced	4-6 Tours	Public Works: Public Works Officer/ CO/XO of Public Works Command Construction Contract Management: OICCCO Shore Activity SEABEES: CO CBC/ Type Command Staff Staff: HQ Systems Command/ CO/XO/ Department Head EFD	Reg. Prof. Eng- ineer/ Arch- itect	Prof. Mil. Ed.
	24 -			Public Works: Public Works Officer/ XO/ Production Officer of Public Works Command Construction Contract Management: ROICC/Deputy OICC SEABEES: CO/ Type Command Staff Staff: Facilities Engineer (Systems Command)		
CDR	22 -	MGMT	2-3 Tours	Public Works: Public Works Officer Construction Contract Management: ROICC/ AROICC SEABEES: XO/ Operations Officer Staff: Facilities Officer	Eng. in Train- ing	Post- grad. School
	20 -					
LT	18 -	Mid- grade Eng. & Dev.	2-3 Tours	Public Works: Staff Civil Engineer/ Assistant Public Works Officer Construction Contract Management: AROICC SEABEES: Company Commander/ Plans and Training Officer/ OIC CBU Staff: Assistant Facilities Manager	Eng. in Train- ing	Post- grad. School
	16 -					
LTJG	14 -	Basic Dev.	Initial Tour	Public Works: Activity Civil Engineer Construction Contract Management: AROICC SEABEES: Assistant Company Commander	Eng. in Train- ing	Post- grad. School
	12 -					
ENS	10 -	Basic Dev.	Initial Tour	Public Works: Activity Civil Engineer Construction Contract Management: AROICC SEABEES: Assistant Company Commander	Eng. in Train- ing	Post- grad. School
	8 -					
	6 -	Basic Dev.	Initial Tour	Public Works: Activity Civil Engineer Construction Contract Management: AROICC SEABEES: Assistant Company Commander	Eng. in Train- ing	Post- grad. School
	4 -					
	2 -	Basic Dev.	Initial Tour	Public Works: Activity Civil Engineer Construction Contract Management: AROICC SEABEES: Assistant Company Commander	Eng. in Train- ing	Post- grad. School
	0 -					

Figure B-9. Civil Engineer Corps Officer Career Path (Source: The Naval Officer Career Planning Guide, 1990)

APPENDIX C. LIST OF INTERVIEWEES

Military

Rear Admiral Bepko, Deputy Commander MSC
Captain Brooks, N88B
Rear Admiral Chaplin, Superintendent, Naval Postgraduate School
Rear Admiral Christenson, N889
Rear Admiral Eaton (RET)
Rear Admiral Foley, N13
Major General Hanlon, N85
Rear Admiral Hart, N86B
Captain Hughes (RET)
Captain Loren, N51B
Lieutenant Commander Maloney, N87D
Rear Admiral McGinn, N88
Rear Admiral Nutwell, N6B
Colonel Parlier, U.S. Army PA&E
Admiral Pilling, VCNO
Captain Strott, N85B
Vice Admiral Tracey, N7

Civilian Defense Official

Dr. Jules Borak, NPRDC
Dr. Allen Zeman, N7B

Academic

Dr. Richard Elster, Provost, Naval Postgraduate School
Dr. Reuben Harris, Chairman Systems Management, Naval Postgraduate School
Dr. Carl Jones, Professor, Naval Postgraduate School
Dr. Peter Purdue, Dean, Naval Postgraduate School

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